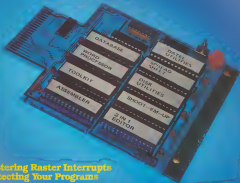


YOUR COMMODORE

DECEMBER 1988

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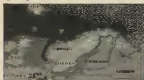
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VOLUME 5 NUMBER 3

ARGUS
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AVAILABLE
2nd DECEMBER
1988

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DATA STATEMENTS

Pac-Man Bounces Back

As a follow up to Pac-Land, GrandSlam are now poised for a burst of Pac-Mania.

In his new adventures, Pac-Man is back in the ghost world but this time it's a 3D scene and the popular tale here was because out of trouble. The ghosts are still haunting the maze but Blinky, Pinky, Inky and Clyde have recruited two new characters, Ser and Jumpy, to help drive Pac-Man away.

Pac-Mania attracting a lot of attention at the recent PC Show and will be available for the Amiga (£19.95) and C64 (£9.95 cassette and £14.95 disk).

Touchline

GrandSlam Entertainment, 12 18 Paul Street London EC2A 4UE Tel 01-247 3413

Braybrook's Back

Andrew Braybrook, British defector and author of *Paradise*, *Utopia* and *Megaphone*, has produced *Demons*, the British Telecom's Pinhead label. The game involves escaping skeletons from the beleaguered Santa Major space station, creating *Demons*.

Active Try Kipling

Active Distribution whose *Warhead* dented the Americans how baseball should be programmed, have now signed a deal which gives them the marketing and distribution rights to Celtic Women's software range. The French company currently hold two important licenses for Walt Disney products and Active's Managing Director, Richard Stubbins, was delighted to successfully negotiate and close the deal in the competitive atmosphere of the PC Show.

The two licenses are for *Kipling's The Jungle Book* and *Barna's Peter Pan*, two of Disney's largest producing cartoon houses. Future titles will also include *Freedom Terror* and *Exorcist*.

Stubbins's company has also been actively signing up the German

software house E&S whose *Zero Gravity* is a similarly moving race runner in their home country. Zero Gravity is a union between games and published sports and will cost £9.95 and £14.95 on C64 cassette and disk or £19.95 on the Amiga.

Also from E&S, we will be hearing and seeing *Ultimate Soundracer*, a music rally with a choice of 127 environments. The program is designed for both amateur and professional programmers who wish to add music to their programs without taking up too much memory.

Touchline

Active Distribution, Greyhound House 14 Greyhound Road, Nine Elms London W8 5NE Tel 01 351 3717

Available for the C64, the game costs £9.95 on cassette and £12.95 on disk.

Touchline

Pinhead Software, 78 New Oxford Street London W1A 1PS Tel 01-477 3773

European Arts

Electronic Arts has been busy signing up the best of successful Europe's software houses. Spain's *Dynama* and France's *Uta Soft* have both recently signed distribution deals with the British branch of the American company.

Electronic Arts will be responsible for the European marketing of *Dynama's* products except for Spain, Portugal and Italy. The *Uta Soft* contract is a reciprocal agreement to handle the sales of the company's products in the UK and Euro is the same way as *Uta Soft* have been handling EA's output to Europe.

Dynama has already had success in the UK charts with *Game Over* and *Army Women*, previously released through Imagine Software. On behalf of Electronic Arts, its Director of European Publishing, Mark Lewis



EA's Mark Lewis (left) in a deal in Peter Pan of *Megaphone* Soft (*Dynama*)

Monster Release

The budget software house seems to be aiming to branch out into the full-price market. The latest contender for the big screen brigade is *Alphamaze*, whose poster-labeled *Alpha Alpha* bursts onto the scene with a major license to produce the computer game based on *The Munster* TV series, which has recently been successfully pulled out of circulation by Channel 4.

The programming team responsible for the game is Topex, an offshoot of Gamma Graphics, currently enjoying independent success with titles such as *Terramex* and *Parablast*.

The TV series features an average American family of successful monsters who think that they are normal and the rest of the world is ugly and weird. Head of the family is Herman Munster, a Frankenstein clone, who is both clumsy and bedridden. His wife Lily, is the daughter of a vampire. Groucho, who spends most of his life in the basement laboratory making up-grades for Herman. With parents like Herman and Lily, it's no wonder that their son, Eddie, is a crony-mixed-up weirdo! The last member of the family is Marilyn, an orphaned niece, considered extremely ugly by the rest of the family.

The game, scheduled for release in mid-November, is available for the C64 (£9.99) and the Amiga (£24.95).



The Munster clan

This month's award for strangulated prose goes to the author of the *Munster* game release. Sort this one out "Q: What do you get when you combine the freshness of a new full-priced software label, but which is the same company to the UK's most successful software house (this is normal) (according to Gallup) with one of the most popular TV programmes

among computer game players of present, with one of the leading programming teams in the country?" Here about, "A. *Countdown*!"

Franchise

Alpha Apps, Unit 1-6 Bidegate Industrial Estate, Patefield, West Yorkshire WF8 2LR Tel: (0497) 267777

and "Naturally we are delighted to have signed Dynamic as one of our affiliated labels. We were attracted to the professionalism Dynamic has shown both in the quality of its products and by the high standard of its marketing."

Of the Ufa Soft deal, Lewis goes on to say "Ufa Soft's products are of a high quality and perfectly suited to the UK market. We are looking forward to working towards chart success with Ufa Soft's titles."

The first release from the new upstart will be *Game Over II* from Dynamic and Ufa Soft's *Iron Lord* (Blizzard) and *Puffy's Sops*.

Franchise

Electronic Arts, 11-15 Station Road, Loughborough LE12 5JH Tel: (0753) 69663



Game director Sandra Miller is pictured in action on the new *Producers*

Kards, Sticks Out

Two new products have been launched by Kards, ready for the Christmas market. As thinking cards, the *Producers* and *Megablasters* are a departure from the hand-held Speed King design which has placed Kards firmly in the forefront of the popular market.

The *Megablasters* is a smaller budget version of the *Producers*. The *Megablasters* (priced £5) has bubble switches and a joystick style handle. The *Producers* (priced £11) features massive arc operation with a moulded handgrip handle.

The new cards are intended as a complementary line alongside the Speed King range rather than as a replacement for them.

Franchise

Kards Products, Unit 23, Ryeview Industrial Estate, 22-24, High Green, Wakefield WF1 1ED Tel: (04943) 126000

Trilogic Open Up

Trilogic have extended beyond their mail order services to include a new computer showroom at their Bradford premises. On sale is the Trilogic Shop in the full range of Trilogic Commodore utility software and hardware, plus C64 computers, 1541H disk drives, Amiga 500 and 2000 machines. For the Amiga, there are also MS-DOS bridge boards, internal floppy and hard drives, laser printers and a host of other add-ons.

The company also has a range of Commodore PCs at "very competitive" prices and can supply all of the leads and connectors for the full range of products.

Trilogic's shop is open from 9.30am to 6.00pm Monday to Wednesday, from 9.30 to 4 on Thursdays and Fridays, and from 9 till 3 on Saturdays.

Franchise

Trilogic, One A, 118 New Works Road, Bradford BD9 3QP Tel 0274 691113

Daley Doesn't

When Daley Thompson leads his name to a project such as Ocean's Olympic Challenge game, he likes to get involved in the action. On a recent visit to check up on the progress of the game, before leaving for his all-starised visit to Seoul, Thompson was so impressed with the advancement in graphics quality from Daley's *Devolution* that he wanted to know all about the system used to create the realistic graphics.

The Ocean team have been having closely with Thompson so that the scoring system is as accurate as possible and his points bank has been on loan to Ocean for reference purposes.

Unfortunately, the *Devolution* star failed to fulfil a nation's hopes by only achieving a disappointing fourth place in the Olympics, despite an encouraging and impressive performance in the 100 metres event. Perhaps a workout in the Ocean game's gym would have helped to improve his performance.

For our view of Daley Thompson's Olympic Challenge, see our review in this issue.

Franchise: Ocean Software, 6 Central Street, Manchester M2 3BS Tel 061 812 6618



Trilogic's stand gave the visiting machines from Oxford.

PC Show

As computer shows go, the PC Show was a great amusement arcade with more prizes than credits. In other words, the major companies went for the instant hype of providing the visitors' imaginations to run riot over the excellence of the forthcoming computer releases. Hype, hype, hype!

There was so little limited software available that I went to look to the show as including SOFTWARE because there was no fix software. The three tapestries for the Christmas number one slot were Thunder Blade from US Gold, Adventure from Activision and Ocean's Operation Wolf, but very little evidence of the software version was available. Time will tell.

The game which got everyone buzzing probably won't make the top ten list, at the moment it's only available for the ST. It's called a Wolf Dream and it's a surreal machine from British Telecom. The gameplay is pretty understated but the concept is so simple, OTT that it has to be on ST and I hope we'll see an enhanced Amiga version soon.

This year's show was held at the new Earls Court venue and most people I talked to seemed to be of the opinion that the atmosphere at the old venue, Olympia, was preferable. The frenetic atmosphere of the London Hall and the hallowed atmosphere of the Business Hall were replaced by the Crystal Hall, which seemed to be a

melancholy of hardware and computer manufacturers, software houses, publishing houses and business software manufacturers. There was a special section for Townsend companies but with very few takeaways in sight.

Commodore's stand stood like a large, black monolith in the middle of the Crystal Hall. Its laminated exterior looked foreboding and menacing compared to the Atari stand, which I found that I'd walked through without even noticing!

Games was the wowword, with US Gold leading an impressive and unimpeachable model beside a more open display area. Microsoft had an impressive speedshop stand which would have given the show had the company loyal on a suitable power supply for their day-on, man machines!

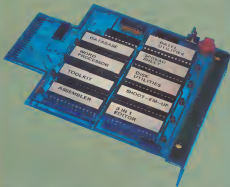
Electronic Arts and Mediagenic (Activision) were in the league of avoiding the public by being hotel rooms and forcing journalists and lesser mortals to their private venues by invitation. On the first day there were such scenes as chauffeurs and fan parking spaces, leading up the Reds and their fans at their eagerness to please their employees. For my part, I struck a blow for anti-doping by arriving at EA in a taxi and played to travelling in a minibus to Mediagenic's venue.

Overall the 1988 PC Show left the body soaked in food and drenched but the spirit shining far more tangible Christmas fun.

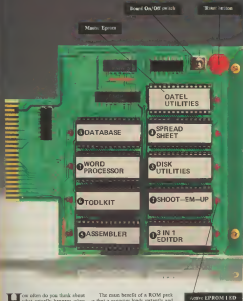
Broaden your mind with Data's SuperRom Expander

By Kerry Fowler

A BIT ON



THE SIDE



How often do you think about what actually happens when you plug in a cartridge? Probably never, because this is one of the least documented but potentially most useful features which the C64 and C128 offer.

The main benefit of a ROM pack is that a program loads instantly and the main applications these days are for backup (single, multi) cartridges and the occasional game cartridge. This halves the true potential of ROM expansion and the area of disc-

ported expanders but only really been explored by Data's range of cartridge constructors and the SuperRam Expander Board.

The SuperRam system is amazing because up to 128K of extra programs can be installed almost instantly via the cartridge port. The programs are stored on eight EPROMs supported by Data's own indexing and programming chip. The EPROMs may be 8K, 16K or 32K capacity or any mixture of these types.

The only problem with this lies not in the expander, but in the operating system of the C64. Cartridges are expected to occupy the EPROM to EPROM regions of memory and the 8K capacity means that the larger EPROMs have to be banked in two or four 8K chunks. To compensate for this the Data on-board operating system has a banking device.

Making the ROM

To create a suitable EPROM for the board, there are two programs on the SuperRam on-board operating system but an EPROM Mirror is necessary to transfer the resultant disk-based programs onto a chip. (Initially suitable and convenient is the Data EPROM programmer, Eprommer 64 (EP999), though any suitably formatted EPROM blower would do.)

The on-board EPROM generator is called up from the SuperRam menu by pressing the F3 key. This displays a secondary menu which allows the user to display the ending of DOS commands and the two program generators, one for machine code and one for Basic routines.

The Basic generator loads a specified file from disk and then allows the user to specify a load address. (This means that relocated Basic programs which leave the lower part of memory free for independent characters or code can be relocated to the correct address.) For natural Basic programs a simple press of the RETURN key is all that is necessary.

The generator also formats the program for booting up from SuperRam and prints out the 161 memory location that was assigned. The top right corner of the screen is used to display the maximum EPROM value that will accommodate the program.

The screen then displays the three EPROM types used for the size to specify which type of EPROM will be used. This is, as expected, done

because an 8K formatted program can be stored on any EPROM but the banking systems differ on each type. Fortunately, the generator will not allow the intended selection of a smaller capacity EPROM than the maximum required.

Before being asked for a filename for the formatted file to be saved under, another decision has to be made. The SuperRam can fit memory at location \$8000 to \$FFFF. This means that the EPROM replaces the section of memory so that any program which commences with any or all of these locations will not run unless the SuperRam is switched out. For Basic, this is hardly necessary.

Once the program is saved, it may be transferred to ROM and then plugged into the board ready for use.

Using the machine code formatter follows roughly similar lines. The program is loaded from disk, the start address entered and there is extra selection panel options.

The first option asks if a RAM/ROM is to be generated. This is to allow the system to create the variable for replacing the C64 operating system with a copy of your own. Even if you merely change the power-up message to display your name, this can be quite an interesting facility though not really applicable for use on the SuperRam board.

Into dual EPROM is for inclusion on the board (the answer to both of the questions posed is 'no' and the memory shaping questions can be tickled). When there have been answers the program generator will output the value that you've given for locations \$81 and the SYS location. After this the process again follows the same steps outlined above for EPROM use (other than saving to disk and EPROM generation).

With both chips on the board, the next up menu of the SuperRam operating system will change to display the status given to the two EPROM programs.

Selecting one of the programs is made by pressing the address number key from one to eight. Bank selection can be made with the F3 key. The EPROM generator returns by pressing F1 and the SuperRam can be switched out or three at normal Basic mode by pressing F1. F7 displays a full EPROM directory which gives more information on the socket number on the board EPROM type the program name and type location \$01 value and

Table no 10769				
EPROM type	RAM	SR	SR	SR
1701 (8K)				
2701 (16K)				
2706 (32K)	4	2	2	1

EPROM bank selection system

the program SYS address for code contents or RUN for Basic programs.

Normal, on-board EPROMs which operate with the cartridge can be fitted to the board. Full instructions for inserting these EPROMs are given in the manual including a simple automatic tester.

The SuperRam Experience

Using the board caused a few initial problems but these were solved off by diving into the instructions, if at times confusing, manual. The small booklet tends to be a little difficult to read if you don't understand how the cartridge system works. At last, it was a bit too ambitious and found that the best practice was to start with small, simple routines before building up to the bigger (more complex) program routines.

Selected programmers should be able to get even more from the board because the potential for external programming of a master chip to control the board is there for those who wish to experiment further.

An initial experiment with the board can be expensive because the SuperRam board costs £29.99, Eprommer 64 costs £40 to £69.99 and eight 32K EPROMs would produce a grand total of £169.98. This may seem expensive but it's a one-off charge because EPROMs can be removed and added to suit your purposes and eight EPROMs only cost £4.99 each for 32K or £3.08 for 16K types.

An extra five pounds for an EPROM eraser would also be a good investment. Since Data don't seem to provide one, you could try your local electronics supplier. Mail order suppliers, Maplin, have one in their catalogue for £6.95 but the particular screen handles up to 40 EPROMs at one time.

Features

Product 2154, SuperRam Board, Supplies Data Software, Data 11 2, The Green Road, Farnham International Area, Farnham, Surrey, UK. Tel: 07142/23811. Machine Code ROM with disk drive Price £29.99.

[illegible][illegible]

Figure 3. *Arise over all Hi-line grapher commands in GCR Runo. Just select one of the many graphics modes and draw 2-D lines. Create curves and a multitude of filled shapes with a single command. No're more sketch commands for rectangles, circles, ellipses and lines.*

To demonstrate the power and versatility of the synthesis language, we have created *Beep*, *Beep*, a flexible code-based drawing synthesizer program. *Beep* takes a text-based specification and then uses a compiler to generate programs with a multitude of fonts. Also included is an interactive drawing language which provides quick and convenient access to each of these new *Beep* *Beep* *Beep*.

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Age Group	Male (%)	Female (%)
18-24	~15	~15
25-34	~25	~25
35-44	~35	~35
45-54	~45	~45
55-64	~55	~55
65-74	~65	~65
75-84	~75	~75
85+	~85	~85

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9	Verizon	\$30.00	\$30.00	\$30.00	\$30.00
10	Comcast	\$20.00	\$20.00	\$20.00	\$20.00
11	Verizon	\$10.00	\$10.00	\$10.00	\$10.00
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What's a raster?

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An interrupt is a short routine which is repeatedly executed during the main program but independent from it. Once the interrupt program (routine) has been dealt with (finished), the main program continues as before. A simple analogy would be a man sitting at his desk, writing a letter when the telephone rings. He answers it and deals with the call then he continues writing. In this example, the man sat at the writing of the letter and the interrupt is the answering of the telephone. It is worth noting that an interrupt can influence or halt the main program through the alteration of memory loca-

tions just as the telephone call could influence the man's letter.

An interrupt can be compared to a sub-routine but is much more powerful since it does not need any command in the main program to call it.

The Commodore 64 has four types of interrupt, which are:

non-
NMV (Non-Maskable Interrupt)
BRE (BRake)
IRQ (Interrupt Request)

The interrupt we are interested in, the raster, is an IRQ interrupt. This is a

general term to describe maskable interrupts which simply means that they can be turned on and off using the following assembly language instructions:

SEI (SEt Interrupt flag)
CLI (CLear Interrupt flag)

SEI is used to enable the interrupts, while CLI is used to enable them.

We can also determine which sources will trigger an IRQ and the four main ones are: sprite collision, sprite in background collision, lightpen and raster line. We are only interested in the raster

What is a raster line?

A Commodore TV picture is raster, made up of 260 very fine lines. These are redrawn twenty times a second to create the impression of a moving picture. Each one of these lines is a raster line and a program can determine which line is being drawn by reading register 16 of the VIC chip, the raster register.

The top and bottom of the screen are usually around 30 and 240 respectively although it varies on different TVs and monitors. The limits of the text screen, however, are always fixed at 40 and 240.

Here we see a problem, the raster line can be as high as 260 but the maximum number that a single register can hold is 255. An extra bit is needed so bit 7 of register 17 is used as the MSB of the raster line.

The VIC allows an interrupt to be generated when the screen display reaches a certain line. To ensure this to happen correctly, we must first do three things:

- 1 We must tell the computer the screen line at which the raster should occur. This is done by writing the desired line number to register 16, the raster register remembering to set bit 7 of register 17 as the MSB.
- 2 We must tell the computer that an interrupt is to be generated by the raster when it reaches that line. This is done by using VIC register 35. This register is called the IMR (Interrupt Mask Register) and unless the bit which corresponds to the desired interrupt is set, along with bit 7, an interrupt will not be generated. The bit has the following significance:

- Bit 0 raster interrupt
- Bit 1 interrupt by sprite-background col
- Bit 2 interrupt by sprite-sprite col
- Bit 3 interrupt by lightpen
- Bit 4 not-allowed
- Bit 5 - must be set if an interrupt is to occur

Therefore to inform the computer to generate an interrupt by raster, we would set bits 0 and 7 of the IMR. This could be done using the following commands:

```
LDIA $10000000
STA IMR
```

- 3 Now we come on to a slight problem

which involves register 25, the IIR (Interrupt Request Register). This is used to indicate the source of an interrupt if more than one is active. If bit 7 is set then an interrupt has been generated and you can determine which type by checking bits 0 to 3 which have the same significance as in the IMR. However, the problem lies in the fact that if this register is not cleared by the interrupt routine then another interrupt will be generated as soon as the routine is finished and the computer will crash. The register can be reset by reading it and then writing the same value back to it like this:

```
LDIA IIR
STA IIR
```

To wrap, this is how to generate a raster interrupt at line 100 -

```
LDIA #100      store the line
                 number
STA VIC-16     set the raster reg
LDIA VIC-17     and reset bit 7
AND #$00111111 set bits 0 and 7
STA VIC-17
LDIA #$10000001 set bit 5 and 7
STA IMR         of the IMR
```

The interrupt will now take place, and the first commands of the routine should be -

Now you see, how to generate an interrupt, but there are still some important things which must be explained such as what happens during an interrupt and where the routine can fit in.

What happens during an interrupt?

We have seen that, when an interrupt is generated, a routine is initiated and then the main program continues, but we must let the computer know where the routine is. We do this by using the IRQ vector which contains the address of the interrupt routine. It is located at \$0170 (\$1034/\$0315) and usually contains the address \$EAB0. This points to an address in ROM which checks the SRUP key, increments the clock, and flashes the screen. If you

want these functions to continue, you must check the IMR to see if one of its sources generated the interrupt. If it didn't the program should jump to \$EAB0. The address of the routine is stored in the IRQ vector in normal 16-bit format.

When changing the IRQ vector, set the interrupt flag first and clear it when you are finished. If this isn't done, an interrupt may occur when only half of the address has been changed, the program would then jump to some unknown address and would probably crash.

Now that we can cause an interrupt and know how to generate one, the only thing which remains is to mark the end. This is done using the assembly language command RTI (Return from Interrupt) but one more consideration must be taken into account. In order that the main program can continue unaffected, we must first save the registers by pushing them onto the stack (the program counter and flags register are saved automatically). This of course means that before we use RTI, we must first restore the registers by pulling them from the stack, as shown below:

PLA	save accumulator
TXA	then save
PLA	X-register
TYA	and finally
PLA	the Y-register
—	perform interrupt routine
PLA	restore register
TAX	making sure that
PLA	they are in the
TAX	right order
PLA	and then
RTI	return from interrupt

This is all the knowledge that is required to construct a raster interrupt; however, there are a few guidelines to programming them that you should be aware of.

Firstly, you need to write a short initialization program. This will only be run once, and will be responsible for the setting up of the first interrupt. During this, the IRQ vector will be changed, the IMR written to and the raster line set. Do not forget to set and clear the interrupt flag during this.

Secondly, after taking the registers, you must have a program which will

determine which source has generated the interrupt and act accordingly. This is needed because there are five sources we have already mentioned plus the system interrupt (the one responsible for feeding the camera etc.). This program should also be responsible for clearing the IRR.

Finally, we write the interrupt routine, or routines, and at the end prepare for the next interrupt, before entering the equates and returning. The preparation for the next interrupt is only the setting of the next raster line - the IRR does not have to be reset.

Practical Examples

The first of the two example programs which I have included is very simple, but is a useful example of how the raster works. It allows three half-screened colours to be used simultaneously and, though this can be achieved using extended colour mode, interrupts don't have the disadvantage of this mode.

The program works by changing the values in \$1238 and \$1261 when the raster reaches lines 0, 180 and 360. When you type in the program and run it, this can clearly be seen as you will now have a three-tone screen. The colours can be changed by poking locations \$1238 (\$4938), \$1261P (\$4931) and \$1238 (\$4938). Fig 1 shows how the routine works.

Lines

80 - 280	These lines are used to set up the variables at the start address - \$C000 (\$4912).
220	
240 - 270	This is the mainloop routine which sets things up. It changes the IRR register to point to TEST.
480 - 490	This is the test to check that the interrupt is by raster line. Same, in this case, the only other possible interrupt source is the system interrupt, we branch to it if interrupt is not by raster.
490 - 500	These lines are the first test to determine the line. If it is greater than 180 the program jumps to test for the other two lines. Otherwise, it continues.

320 - 330

This sets things up for the main routine. The values is put into the accumulator and the next raster line into the X-register.

340 - 370

This is the main routine where all the work is done. The already prepared value of the colour and raster are put in the proper places.

380 - 440

This restores the registers and returns from the interrupt. These lines set out the colour and raster lines for the COLLOUR equates.

670 - 740

Another thing to note about this routine is that the main work section (lines 330-370) is only written once although in this case it is small. You should always try to make the main routine small with as little work to do as possible.

If you want to use this program as part of your Basic program, you can change the three colours by poking the colour into \$9008 for the top colour, \$9231 for the middle colour and \$9238 for the bottom colour.

The second example is based around the same code, as fact lines 18-340 are almost identical. This is because exactly the same procedures should be used each time.

The program gives 16 sprites simultaneously on screen. It works by copying the values from a table of sprite positions into the VIC registers when the line is at zero. Thus, when the line reaches 120, new data is fetched from a second set of values. This is done continuously so that the display of 16 sprites is rotated although the real number on screen at one time is actually eight. Fig 2 shows how this routine works.

Lines

300 - 340	These lines prepare the registers for the main routine. The X-register again contains the next raster line number, but this time the address of TABLE1 is stored at locations \$F0 and \$F1C.
-----------	---

500 - 630

This is the main COPY routine. It sets up a loop and transfers the 16 values from the pre-defined table and copies them into the first 16 registers of the VIC. It then sets the raster for the next interrupt.

640 - 690

These lines are used to restore the registers.

720 - 770

These lines are used to prepare the equates. These lines are used to prepare the equates where the other table of values is required. It works as lines 500 - 540.

720 - 770

Again, you will notice that the main routine is only written once and the equates are prepared for it. This is slightly more complicated than in the first routine but should not be too difficult to understand because the principles are the same.

To use the program from Basic, position first line and execute it using SYS 49152. You then put the values of your sprite positions into the two different tables, in the same format as the normal registers. The tables are located at \$9008 (\$C100) and \$9004 (\$C104).

Now for the drawback of this method. Since the first set of sprites are rewritten out at line 120, any sprites from the first data set which comes after line will be cut off at that point. For the same reason, any sprite from the second set which goes too close to the line will disappear completely.

The guidelines should be that, for set one, the sprite's X co-ordinates should not be more than 158, and for set two, it's Y co-ordinates should be less than 125.

This example is only a very simple one and you are free of course to copy the "spray" routines, pointers and anything else you feel like copying.

In this article I have presented the necessary information to write your own raster routine. I have also included two simple examples to help you get the hang of things and I think you'll find that, if you use the raster well, it can be an immensely powerful aid to programming.

[Bombuzal]

H

ow I can tell you how much I love this game. I've played it for hours and hours, and I'm still not bored. It's a game that's easy to learn, but it's not easy to master. It's a game that's simple, but it's not simple. It's a game that's fun, but it's not fun. It's a game that's addictive, but it's not addictive. It's a game that's... well, it's a game that's just what I need.

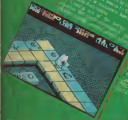


Memorabilia

When I was a kid, I used to play a game called Bombuzal. It was a game that was... well, it was a game that was just what I needed.

It was a game that was... well, it was a game that was just what I needed.

It was a game that was... well, it was a game that was just what I needed.



[Bombuzal]

When I was a kid, I used to play a game called Bombuzal. It was a game that was... well, it was a game that was just what I needed.

It was a game that was... well, it was a game that was just what I needed.

It was a game that was... well, it was a game that was just what I needed.

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It was a game that was... well, it was a game that was just what I needed.

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It was a game that was... well, it was a game that was just what I needed.

It was a game that was... well, it was a game that was just what I needed.



Daley Thompson's Olympic Challenge

100

Title Order: Thompson's Olympic Challenge Supplier
Owen & Co Ltd 20 Manchester Rd FVE Tel 061-44
5010 Price £3.95 (p.p.s.)

Daisy is back, in a plant branched to compete with its attempt to become the only rose in town (there's 180,000 gold medals in the toughest event of them all, the Decathlon).

As everyone now knows, he failed and had to settle for fourth place. However, he will still be regarded by many as one of the greatest athletes of all time.

Now you can better his performance, as Gomez, once again, is first all the time with an Olympic game. It was two years ago that Gomez released Daley Thompson's Decathlete, and set out to make the whole sports game better. The company that made the whole game was based on Daley Thompson's Olympic game. Daley Thompson's Olympic game, but by then the Olympic game was over but now that is the Gomez's first all the time with Daley Thompson's Olympic game. It was the first all the time with Daley Thompson's Olympic game.

Over more, this is a game that will test both you and your opponent as the speed of waffle has a dramatic effect on your chances of Gold by reaching the 9000 point total (this will smooth the world record).

However, it's now five years later and Oscar realizes that a working paper is too long a thought, so Oscar and Oscar, somewhat nervous as to get a better seat than a girl working, and you also have to get it before the chance. Then not only help the game considerably, but also keep the various species happy because the more they you build up in the game is represented by one of the most and the most, almost without showing the right spots' their for the job and you've got to get it, and all the above.

In the gym, you must work out at the weights and ropes to build up enough strength and power to battle the grueling

Now, you're ready for the start of the 100 meters. The gun fires and you're off! Time sagitts in fast as you can and cross the line in as little as 13 seconds. That's much faster than you can run and to the point ends for you. Are you going to let this get you down? Of course, but soon you're back for a second go and this time you pick the right pair of sneakers about. Instead of running in a pair designed for high jumps, you've got the sprinter's which let you run quickly and take, as you know.

You'll need the same combination of winging speed and skill to compete in the 400 meters and the last event, the 1500 meters, but you'll be pleased to know that your finely tuned slow physical movements to make the pace used the final, longer event.

Timing is also important factor in the high jump, long jump, hurdles and pole vault, where you must be able to build up speed and then prime fire when you're ready to jump. As before, having the right type of shoes and building up enough strength in the legs is enough to carry you through.

Similarly, the jewelry that you choose requires spend in the stand up plus among and parents at the throne. As in all the events, the faster you move, the further you get, and the more points you score, but if you don't reach a minimum standard then the game will end.

Overall, Nancy Thompson's Olympic Challenge is a worthy successor to the record-breaking game of four years ago and should find a few players in its own right. It takes a young to attempt another deinition Gold in Barcelona. The same team will be running their programme for Daisy Williams in 1987.

Evan Hollister

Choosing an Assembler

Assemblers are essential programming aids so we offer counsel to the aspiring machine coder

By Gordon Davis

There's certainly a tremendous revival of interest in high-level languages, particularly on fast, high-capacity machines like the Amega. On these machines it's possible to run some very advanced compilers that will compile your C, Basic or whatever to run at 604 machine code speeds. This is a cold comfort for people like us who are still looking away on the 104. For us machine code is a must. There's certainly no other way to get those real-time speeds that I would strive

if machine code is a must: then to us an assembler of some sort. Although there may well be some basic people out there who are still programming in Basic or on some rare assembler, the only route to real productivity is to use a proper symbolic assembler.

Talking to the Chip

As any one knows, an assembler is just one way of rendering comprehensible the built-in binary instructions which

only the machine CPU can understand. The 6500 in the case. AS assemblers require the entry of a source code which can then later instructs for binary machine code instructions. These are then converted into machine-readable object code.

Beyond this a wide variety of extra instructions can be added, some of which are essential, some not. I mentioned symbolic assembly, and this is definitely essential.

Firstly, symbolic assembly gives you the ability to assign values to alphanumeric labels which you can refer to in the source code as operands and so on. Values are usually assigned using the EQU (equates) statement at the start of the code. This means that the alterations need only be made in one place in the program to change it all.

Secondly, and probably more importantly, labels are vital when it comes to assigning flow of control within a program. Branch relative

instructions can be impossible otherwise. These have to have an operand addressing a jump of between +127 and -128 bytes from the instructions.

You really do not want to have to calculate relative branches every time you change the program as a symbolic assembler will allow you to assign a label to an instruction. When the source code is assembled the assembler will automatically calculate the relevant branch so that address and assign it to the operand.

Knots and Buttons

Like most, assembler programs are heavy all the knots and buttons you need. Also for reasons, too many of these may simply confuse the beginner.

Look for the keywords 'Two-pass'! This simply means that the assembler is a compiler. There's no way that you can assign values to labels without first going through the source code.

One way to assess the strength of an assembler is the price and range of the "standard products" that the assembler can. We've already met one pseudo-opcode, namely EQU. It's a three-letter code, like LDA, PHP or any 4000 movements, but it doesn't produce 4510 object code, merely tells the assembler to do something at "assemble time".

There codes are commonly known as assembler directives. All symbolic assemblers will have the directive EQU, but they vary widely with respect to others. A wide variety is possible when it comes to data operands. Supra's 68000 has only three data descriptors, WQW, BBT and TAT, which describe its specific data as two-byte words, single bytes or storage by content. Z80004 has seven such descriptors.

Modifiers

Once you've written your source code and assembled it, you'll very likely want to debug it as one of the most vital phases in a assembler. Most assemblers do some complete work done, but they vary widely in their options.

A assembler may come with a small macro-assembler machine code half-word, e.g., byte, register dump and so on. On the other hand the Long-Growth Analyzer is an incredible patch of software, hardly a assembler as it can even be programmed in a subset of Fortran.

Macros of Long-Growth assembler brings us to two other hardware, macros and conditional macros.

Macro assembly is a way of producing more compact source code. It allows you to let a chunk of code that may be used more than once through a single keyword, which you can drop in wherever you want. The full listing is repeated out at assemble time.

Conditional assembly, on the other hand, means that you can set or reset switches in the source code, which enable you to control very closely which parts of the code are assembled in one case, or all of the assemblers. I know, only Long-Growth supports both macro and conditional assembly.

Getting on in

The trouble is, once you've decided

what you want from an assembler, there's no reason why there should be these days. Unfortunately, a very large number of assemblers have been produced for the C84, many of them excellent. The unfortunate change that most of them are no longer easily available although some remainder may well be found in the shops. This is due to the small margins involved making quality software. Companies that, specialized in this area have a tendency to rather move on or die.

As far as I can make out, the choice of easily available products comes down to just two products. There may be more but I've left anyone out it's because they simply haven't bothered promoting the product properly. The first are Macro from SupraSoft, the strictly named YERASO2ASSEM from Task Engineering Research, the Merlin 120 assembler from Financial Systems Software and Speedy Assembler which is from some other firm at Your Commodore.

The Merlin 120 is a well-regarded 6120 assembler which we reviewed a couple of weeks back, and there is a C84 version available in the US but not, as yet, in the UK.

I don't want to say a lot about Speedy Assembler, one problem, except that it is, of course, powerful very reasonably priced, bug-free (well almost), amazingly well-documented and that every purchaser has the chance to write a right out with Street Compiler, the assembler has what, certainly Your Commodore editor, and an incredibly wonderful and more human being. This man is nothing short of a... (That's quite enough. I'll catch SUB-EDITOR.)

Also, SupraSoft, though I can say that Speedy Assembler has one unique feature, namely a second symbol table which provides global references across a whole lot of source files. In general terms, it handles redefines the last, named Z80004 assembler.

SupraSoft's 68000 may well appeal strongly to the fast-food machine code it offers the convenience of being on cartridge and a simple, but adequate, and includes a monitor. The one drawback is the price, which is at least on the high side for this sort of product.

The YER product is considerably cheaper, but much more spartan. There is no monitor and a minimum of pseudo-ops and macros. It is,

however, a true symbolic assembler and can be recommended to the beginner for its simplicity.

Also...

Just because a product isn't being marketed doesn't mean that you won't be able to find it. Copas may be gathering dust in a computer store or second hand shop. Some excellent assemblers may turn up this way and I'd just like to mention them.

An Unbelievable Machine for the Commodore Macro Assembler, one of the earliest marketed and from Commodore itself, very useful for the price and still in use, so far as I can make out, by a large number of our readers.

My personal golden side is Z8004, the one which I started out with. This has very clear documentation, and contains enough features to make a midway between simple beginner's packages and professional assemblers.

Long-Growth is one of the latest. This is an extraordinary package with every one of the bells and whistles you could want. Like a rigorous package assembler, macros, and that Fortran-based analyzer I mentioned earlier. The assembler's got the lot including macros and conditional assembly. I wouldn't recommend it for beginners but the 40-page manual is comprehensive as hell.

Look on your - you may be lucky. The package was marketed by Dave Software but it got dropped and disappeared quietly. With some sales marketing it could have kept the field.

So there we are. There are as many as the currently available products are, they are for the most part, but is unfortunately on the software of yesterday. The message is to keep looking through these remainder bins.

Toolbox

Product: Macro Assembler **Supplier:** SupraSoft, 1704000000, Moore Campus Rd, Woodhouse, Wrexham, Tel 01-5071998 **Price:** £37.50

Product: YERASO2ASSEM **Supplier:** Task Engineering Research, The Fishers Centre, 4 Fishergate, York YO1 4LE Tel 0904(0)55323 **Price:** £33.00

Product: PC Speedy Assembler **Supplier:** TC Systems Services ASL Ltd, 9 Hall Rd, North Moulton, North Price £4.50

Creating Characters

Create better print quality for your Plus/4 with this handy utility

By Frank Carson

The Plus 4 and MPS 801 with built-in software provides a wordprocessor package at a price even my wife approves of.

The MPS 801-800 printers have a lot to be desired and any method of improving the output is very welcome.

In the February 1987 issue of *Your Commodore*, the program 'Word-Pro Add-On' was published which vastly improved the potential of these lowly machines.

The reasoning behind this program was to incorporate the *Services User Guide* (SUG) descender set into the Plus 4 wordprocessor and to combine the two programs. The *Word-Pro Add On* program uses the bit image printer mode to reform certain characters and the underline.

Entering M/C Code

This is a complete machine code program and is entered using the built-in M/C monitor. For information regarding the monitor refer to Section 3 of the Plus 4 User Manual. The four listings in this program will be located between memory locations \$7000 to \$7AFF. To use the monitor press M then Shift-0 and press Return. The monitor status will then be displayed. The address of memory we require can now be filled with zeros. Enter \$7000, TAPE OFF and press Return.

Enter M7000 and press Return. The contents at \$7000 will appear (all zeros). The first line can now be stored (last 1 \$7000 to \$700F).

```
>7000 00 00 00 00 00 00 00 00 Return
>7001 00 00 00 00 00 00 00 00 Return
>7002 and so on
```

The new data is now in memory. Refresh the data and enter any other

as you go along. This data can be stored on disk at any time \$>name",A,3000,TAPE Return.

NE is this mode files can not be updated - a new name each time! One option is to use the day and the location. Such as 'THISM98' "THIS"180" etc. To load the file from the monitor L"THIS7106",A Return. Then M7106 Return. This will display the new location for data entry.

List 3 is very short \$7340 to \$734F

List 4 is a little longer \$7600 to \$76AF
List 4 is the main program \$7900 to \$79AF

List 1 was published in the *Services User Guide* 1987 as a basic program (New characters on the MPS801, 2) DESCENDER SET). Listings of how other characters are supplied or you can design your own sets. Reports will be available details later.

Using Nufont

The program is loaded directly from the keyboard.

LQAD"NUFONT",A,1 Return

\$7330000 return will install the program and load the wordprocessor.

This will operate in normal. The reversed printing commands are used with up/down for enhanced type and underline. (See page 33 of the Plus 4 Software Manual.)

Use up/down for enhanced mode
up/down to underline
up/down to cancel
up/down to cancel

Documents is compiled using Pedit or the standard software are interchangeable. Using the standard software the underline-enhancements will be ignored.



Frank Carson is a software engineer and a Commodore Plus/4 user. He has written several programs for the Plus/4, including the 'Word-Pro Add-On' program.

The new commands can be called or cancelled as well. However the Plus 4 software has a limit of its own and you may find a command is ignored.

For instance it may appear an asc command at the end of a line. In that case the command needs to be inserted at the beginning of the next line.

The Plus 4 makes an allowance for the extra space required in the enhanced mode. This must be taken into account by the operator.

The complete document can be in the enhanced mode but there will be only 40 lines to a line and the equivalent of 34 lines to a sheet. Word wrap will not work.

It is important that any underline or enhance command are cancelled prior to the end of a document. Failure to do so can cause trouble if more than one copy is to be printed.

MPS 801 owners please note I do not own a MPS 801 however I can see no reason why this program should cause any trouble using the MPS 801.

For those of you without, Report of 'Word-Pro Add On' (Your Commodore February 1987) and 'New characters on the MPS 801' (Services User Guide 1987) are available as photostats from the Reader Services Department at HALF PRICE! £3.50 gets you both articles (normally £12.50 each).

Frank's

Reader Services Department
ASP Ltd
2, Bell Road
Worthing, West Sussex
BN1 1PH

See listings on page 42

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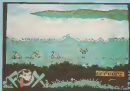
Trade enquiries only to: Commodore Ltd, 100, The Quadrant, London W1 8 7LH. Tel: 01-262 8888. Fax: 01-262 8889.

Foxx Fights Back

If you're the kind of person who S.O.B. more often, do the pursuit rather than the pursued, then this fox hunt is apt to appeal to you. For the first time the fox gets the chance to stand back - with lead bullets!

Image Works and the programmers, Denton Design, seem to have had their wits crossed over the name of the main character. The packaging sports the name Foxx but the program seems to prefer the more orthodox spelling, Fox. Whichever is correct, the structure is still a mean one of a name.

Foxx and his partner are hungry so, armed only with a pistol, it's out of the safety of the den and into the cold, strange world. The world is depicted on superb graphics with parallel scrolling giving an added feeling of depth.



Along the way to his first meal, Foxx has to run the gauntlet past malevolent squirrels who sit hidden, highly explosive, nests down from the trees. As he progresses, the dogs from the local hunt pack appear around. The Hell's Bangers have found him.

That is the little touch that makes the game. If Foxx outpaces these wretched hounds, they leap on their motorbikes and give chase. Like Foxx's motivation, the frames for the dogs give a truly cartoon feel to the game. Full points must go to Denton Design who share all of their collective experience gained over years of programming the C64.

Shunning through the pack, Image Foxx to the orchard where apples can be picked all the time. There are only five of them but that's amazingly fortunate because our

hero can only carry that many. Fox Foes must go back to his lair to unburden himself.

At this point it is an advantage if all of the dogs have been wiped out. There is only a limited number of three and a stranger will help you out here. The last name, I discovered, was to quickly approach the point where the dogs appear. The program seems to have a trigger point where the dogs are lured and, by leaping on this spot and jumping back, only a handful of dogs appear who are then easily wiped out with the pistol. Eventually, you reach that happy state where the onslaught stops and you have a clear path to the front and then on the return journey there are only the mice, squirrels to contend with.

Back at the den, I really started to feel sorry for Foxx. His wife is a real tartar on the scene that she's an actual source of discontent. After having lost her life for a handful of apples, she sends him on his way with a slap in his ear. Even worse, returning empty handed results in a serious beating with a rolling pin. Absolutely no sympathy, if I were Foxx, I'd have left home long ago.

The next phase in the quest for food takes Foxx through the chicken shed. On the way, he passes a rabbit warren which is a handy source of food and a damaged rifle which has a greater value than his pistol.

Trapped in the coop involves leaping onto the nearest wall and blasting away. In this way, fewer chickens have to be shot and that means less bloodshed of him being aggro-murdered by a barrage from those foul creatures.

Later in the game, the mean malevolent mouse, a mouse which must be crushed to reach the last of the berries, has all the time there are dogs, dogs, dogs.

Foxx Strikes Back is a really enjoyable game to play.



but I really must take the advertising department of Image Works to task. They mislabeled this game to have urbanism as the way to run the miserable against the unspeakable. I'm sure that anyone who suffers unnecessary killing will be shocked by the message that a fox armed with a sub-machine gun can save. Red is tooth claw and fur, the game is a repulsive misstatement.

Eric Doyle

Franchise

Foxx, Fox, Strikes Back, Snapper, Image Works, Mountain Mouse, 25/25 Shoe Lane, London EC4P 6AP, Tel. 01 261 1949. Machine C64/C55. Price £5.99/£4.99 (incl. tax).

The day Daniel's dad brought his office printer home.



My dad's office is always busy so he has lots of LC-10 printers at his office.

In fact, he sometimes has so much work to do that he keeps a personal computer in his study so he can bring work home.

But as for his really busy, he brings home one of those Star printers too.

Of course, I know exactly how to use them because we have three colour monitors at school.

I can print documents in four different colours. So I'm not surprised WHAT MICRO? called the LC-10 the Best Budget Colour Home Printer* on the market.

What's more it's a lot less expensive than other printers but much better quality.

My friend, Philip, even has one for his Commodore. I can start the front control panel's child's play.

The wide choice of fonts gives you so many different style options when you print things.

It's pretty fast too with a double-line speed of 144cps and high-density near letter quality, at 36cps.

There's also the LC-10's special feature called 'push backer' which gives the lowest tear-off position of the paper.

And you can print continuous paper and automatically load single sheets—and I think that's unique for this sort of printer.

You know, if I keep my paper round going for a few more weeks I'll soon have enough to buy my own LC-10.

And then for a small fee, I can borrow more.



THE
star
COMPUTER PRINTERS

Star Limited, 4, 1st
Clarendon Avenue, 402-4 Clarendon Road,
Telok Ayer Stair, Singapore 150050
Telephone: 25-84-1800
Advised on all
Star Machine Co. Ltd. Japan

Please provide details of the Star LC-10 to receive more information.

Name

Company

Address

Postcode Telephone

Or you can telephone 051-2441 0071. 1-800-00-00

BATTLE ISLAND

Novagen have squeezed a quest into a point plot - but does it taste as sweet?

Novagen don't do that many games so you may well be aware. Their first big hit was *Encounter* which lost because the delicious *Hardcore* class. This was followed up by *Minotaur* which really showed what could be done in 64k.

Now comes *Battle Island* which departs from their usual style of game as to much as we have a more conventional hard-core view, Commando style game with more and adventure elements thrown in for good measure.

Sounds a bit ran of the mill? Well yes and no. The scenario is certainly nothing new but the fact that there are 160 screens worth of scrolling action all of which is scenery rendered thanks to a rather nifty data compression system recovered by Paul Wootan and programmed in by Gary Watson. Still, enough background, let's take a look at what *Battle Island* has to offer.



The Mission

The story is set on a tiny Pacific Island where, presumably, some wicked scientist has built and installed a Nuclear Bomb (which will no doubt be used to get freshwater cheap out of polluting houses quicker).

As is customary, most teams of such troops have been sent ahead of you but none of them made it back (at least no body - old you has been picked to save the day. So it's off to your little rubber dinghy onto *Battle Island* (close-down-dubbb).

All you get in the way of equipment is a gun and a map showing the general outline of the island and the small

nucleus in the centre which is where the bomb is stored. It's up to you to get round the maze-like island, find all right pieces of a bridge which will allow you to cross the most so that you can destroy the bomb, weapons and make the world a safe place once more (!). Oh, and the other thing I forgot to mention was that there are also hostages on the island which need rescuing. All in all, you've got your work cut out for you.

Where does one begin on such a monumental adventure? Well, a good start is to have a close look at the map. This will give you a rough idea of scale and help you to avoid a lot of the dead-ends caused by barbed wire fences, walls etc. Once you get the general feel for the terrain that's set ahead, you can start to plan.

The game sets a single priority which functions as the most manner the space bar fires off any smart bombs you may have accumulated and holding down the fire button activates any shields you've collected.

The background has a Japanese feel because of the way the perspective is depicted. The background characters are simple but adequate at depicting your enemy troops and the various objects that you can pick up on the way. Most of these objects have distinct uses and one in particular is essential if you are to complete the mission.

Extra firepower is gained by shooting buildings. Once hit a dozen or so at one shot, one of the topmost turns into a star which when picked up, increases your ammunition by a factor of two. Once three of these have been picked up you can have three bullets flying across the screen at the same time. Once a fourth star is earned you are equipped with a shield which as you may expect is quite useful in certain situations.

As for game play, I can only say that it's one of those games that will infuriate you enough to keep going, without being so difficult that you just want to throw the joystick, the 64 and your mouse out of the window.

Death is not terminal in this game because you can start from the last checkpoint gate you went through in the next, and all future games during that particular mission. It's a shame you can't save and load gameplay into the game, as I can see a lot of players getting very pissed if their goal is almost in sight and they have to end the mission for the day and go back to the start. I guess that's all part of a graphic adventure's appeal.

The disk version could also have had a high score table that would itself be disk (so could so many games - cause on game it only takes a couple of blocks).

Audio effects are a bit naff too. The sound of you losing one of your enemy units is the sort of thing you hear when it's cut-out on a game show gets a question right. Mind you, the music is quite good so I shouldn't really complain too much, should I?

All in all, *Battle Island* is an enjoyable game but not really the sort of thing we've come to expect from Novagen, though it does make a change from all the standard shoot-'em-ups and it's good to see one that actually requires a little thought.

Kevin Corbett

Footnote

Title: *Battle Island* **Developer:** Novagen, 342 Alcoron Road, Birmingham, B11 8HS. **Tel:** 021-666 9416 **Manufacturer:** CMA, 128 Peter, CV 35 (cost £19.95 (disk)).

Function Key Labeller

Looking through pages and pages of an instruction manual to find out which function key does what is a thing of a past

*By
Colin Howard*



F1	FILE	F10	PRINT
F2	EDIT	F11	CANCEL
F3	SEARCH	F12	HELP
F4	EXEC	F13	EDIT

A printed label

The wonderful dragons of the C64 blessed it with some extremely handy function keys four of them in fact. These function keys have been put to a variety of different uses: they've been used to bring up pop-up menus, activate disk drives at their own rate that wonderful thing, the smart-beak, to ab-

sorb-up games. The only problem is remembering which key does what.

Manufacturers of other computers with function keys obviously realised that this could be a problem and so created for it. One shining example must be Acorn's RISC computers, they have a clear plastic strip above the function keys under which you can slip a

strip of paper under telling you every-thing you need to know.

In the past Your Commodore has published a function key template for the C64 that overcomes this problem. It used the 1520 printer plotter to draw a template that could be cut out and placed around the function keys. The operators of each key clearly marked.

Unfortunately 1520 printer plots are now a little less than on the ground. This version of the program uses any Commodore compatible printer to produce a clearly labeled template.

Using the program

The program is presented here as a Basic listing. You should type it in using our *Keymap Checker* tool. (Setup) to minimise typing errors. Once the program is typed in and saved simply RUN it.

When the program is started it offers several options to edit the information to be printed a password to the user. It is important to note that not more than 7 letters can be entered for each function key.

Because every make or model of printer is slightly different you may have to play around with the print statements that produce the template to get the best layout for your setup.

Double Height

When you want to highlight something on your C64 monitor screen, the Commodore character set is somewhat lacking in respect.

The small program presented here changes the character set in such a way that a new double-height set is made available. Now important messages or game titles can be made to really stand out.

Getting It In

The program is presented in the form of a Basic loader. Type this in using our Syntax Checker (see listings pages for more details). Once you have typed the program or save it to disk or tape **BEFORE** you run it.

The Basic Loader that you have just entered is designed to save the machine code for Double Height on your own disk or tape. Before you run the loader make sure that you have the disk or tape that you want the program saved to in the relevant drive.

When you run the Basic loader, after a few seconds the prompt "SAVE TO TAPE OR DISK?" will appear. Choose the correct medium and the machine code will be saved. If you now check your disk directory or tape you will find that a new program DBL HEIGHT is present. This is the

*Enhance your text
displays with an
expanded character
set*

By Chris Harner

program that you should now use, the Basic loader can be forgotten about.

To produce double height characters you use a combination of SHIFT plus the letter that you require on the Commodore key and the letter you require. If you try this you will notice that **SHIFT + letter** produces the top half of the letter and **COMMODORE + letter** produces the bottom half of the character that you require.

You will, no doubt, realise that each line that you want to print in double height will have to be printed twice, once using SHIFT and then again a line lower using the Commodore key. To clarify this, let's say that you wished to print the letter ABC

in double height. A program to do this would look like the following:

```
10 PRINT "SHIFTED A"
(SHIFTED B) (SHIFTED C)"
20 PRINT "COM A" (COM B) (COM C)"
```

It is possible to make the top and bottom of your characters a different colour by using:

```
POKE 540, new colour
before each PRINT line
```

Using the program

When you want to use the DOUBLE HEIGHT program you should do the following:

Load the program DBL HEIGHT using:

```
LOAD "DBL HEIGHT", 1,1 if using disk
or LOAD "DBL HEIGHT", 1,1 if using cassette
```

When loaded type the following:
POKE 552,48 POKE 553,48
POKE 55279,39 CLR

The new double height characters are now ready for use.

Can You Stop The Russian Bear?



Red Storm Rising

Available on IBM, Apple, and other popular computers.
Learn why Red Storm Rising is the most powerful
simulation ever created for your home.

Red Storm Rising is a computer simulation of the war between the Soviet Union and the United States. It is the most powerful simulation ever created for your home. It is the most powerful simulation ever created for your home.

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MICRO PROSE
The most powerful simulation ever created for your home.

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Red Storm Rising

[illegible]

Although it is true that the business might not deliver what he hoped would be a powerful and detailed analysis of the budget and that budget is, in the main, still a "preliminary" one, it is noteworthy to see that the report is so thorough.

Your next lesson should concern personal versus commercial travel. Travel agents usually advise that a travel agent's job is to sell, and that is true. However, agents are also educators and the word education is often overlooked. The education comes in the form of the information that is available to the travel agent and the traveler. The traveler should be an informed consumer of the services being provided and the agent should be an informed provider of the services. The agent should be able to answer the traveler's questions and provide the traveler with the information that is needed to make a decision.

As a general rule, you can't do anything on the north side of the river until the Norwegian government has been established. For the DRG, the goal is the Gungah, Sweden, the most developed nation, and the American and German banks, because it is the only one that can handle the money. The Norwegian government is the only one that can handle the money. The Norwegian government is the only one that can handle the money.

1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021, 2022, 2023, 2024, 2025, 2026, 2027, 2028, 2029, 2030, 2031, 2032, 2033, 2034, 2035, 2036, 2037, 2038, 2039, 2040, 2041, 2042, 2043, 2044, 2045, 2046, 2047, 2048, 2049, 2050, 2051, 2052, 2053, 2054, 2055, 2056, 2057, 2058, 2059, 2060, 2061, 2062, 2063, 2064, 2065, 2066, 2067, 2068, 2069, 2070, 2071, 2072, 2073, 2074, 2075, 2076, 2077, 2078, 2079, 2080, 2081, 2082, 2083, 2084, 2085, 2086, 2087, 2088, 2089, 2090, 2091, 2092, 2093, 2094, 2095, 2096, 2097, 2098, 2099, 2100, 2101, 2102, 2103, 2104, 2105, 2106, 2107, 2108, 2109, 2110, 2111, 2112, 2113, 2114, 2115, 2116, 2117, 2118, 2119, 2120, 2121, 2122, 2123, 2124, 2125, 2126, 2127, 2128, 2129, 2130, 2131, 2132, 2133, 2134, 2135, 2136, 2137, 2138, 2139, 2140, 2141, 2142, 2143, 2144, 2145, 2146, 2147, 2148, 2149, 2150, 2151, 2152, 2153, 2154, 2155, 2156, 2157, 2158, 2159, 2160, 2161, 2162, 2163, 2164, 2165, 2166, 2167, 2168, 2169, 2170, 2171, 2172, 2173, 2174, 2175, 2176, 2177, 2178, 2179, 2180, 2181, 2182, 2183, 2184, 2185, 2186, 2187, 2188, 2189, 2190, 2191, 2192, 2193, 2194, 2195, 2196, 2197, 2198, 2199, 2200, 2201, 2202, 2203, 2204, 2205, 2206, 2207, 2208, 2209, 2210, 2211, 2212, 2213, 2214, 2215, 2216, 2217, 2218, 2219, 2220, 2221, 2222, 2223, 2224, 2225, 2226, 2227, 2228, 2229, 2230, 2231, 2232, 2233, 2234, 2235, 2236, 2237, 2238, 2239, 2240, 2241, 2242, 2243, 2244, 2245, 2246, 2247, 2248, 2249, 2250, 2251, 2252, 2253, 2254, 2255, 2256, 2257, 2258, 2259, 2260, 2261, 2262, 2263, 2264, 2265, 2266, 2267, 2268, 2269, 2270, 2271, 2272, 2273, 2274, 2275, 2276, 2277, 2278, 2279, 2280, 2281, 2282, 2283, 2284, 2285, 2286, 2287, 2288, 2289, 2290, 2291, 2292, 2293, 2294, 2295, 2296, 2297, 2298, 2299, 2300, 2301, 2302, 2303, 2304, 2305, 2306, 2307, 2308, 2309, 2310, 2311, 2312, 2313, 2314, 2315, 2316, 2317, 2318, 2319, 2320, 2321, 2322, 2323, 2324, 2325, 2326, 2327, 2328, 2329, 2330, 2331, 2332, 2333, 2334, 2335, 2336, 2337, 2338, 2339, 2340, 2341, 2342, 2343, 2344, 2345, 2346, 2347, 2348, 2349, 2350, 2351, 2352, 2353, 2354, 2355, 2356, 2357, 2358, 2359, 2360, 2361, 2362, 2363, 2364, 2365, 2366, 2367, 2368, 2369, 2370, 2371, 2372, 2373, 2374, 2375, 2376, 2377, 2378, 2379, 2380, 2381, 2382, 2383, 2384, 2385, 2386, 2387, 2388, 2389, 2390, 2391, 2392, 2393, 2394, 2395, 2396, 2397, 2398, 2399, 2400, 2401, 2402, 2403, 2404, 2405, 2406, 2407, 2408, 2409, 2410, 2411, 2412, 2413, 2414, 2415, 2416, 2417, 2418, 2419, 2420, 2421, 2422, 2423, 2424, 2425, 2426, 2427, 2428, 2429, 2430, 2431, 2432, 2433, 2434, 2435, 2436, 2437, 2438, 2439, 2440, 2441, 2442, 2443, 2444, 2445, 2446, 2447, 2448, 2449, 2450, 2451, 2452, 2453, 2454, 2455, 2456, 2457, 2458, 2459, 2460, 2461, 2462, 2463, 2464, 2465, 2466, 2467, 2468, 2469, 2470, 2471, 2472, 2473, 2474, 2475, 2476, 2477, 2478, 2479, 2480, 2481, 2482, 2483, 2484, 2485, 2486, 2487, 2488, 2489, 2490, 2491, 2492, 2493, 2494, 2495, 2496, 2497, 2498, 2499, 2500, 2501, 2502, 2503, 2504, 2505, 2506, 2507, 2508, 2509, 2510, 2511, 2512, 2513, 2514, 2515, 2516, 2517, 2518, 2519, 2520, 2521, 2522, 2523, 2524, 2525, 2526, 2527, 2528, 2529, 2530, 2531, 2532, 2533, 2534, 2535, 2536, 2537, 2538, 2539, 2540, 2541, 2542, 2543, 2544, 2545, 2546, 2547, 2548, 2549, 2550, 2551, 2552, 2553, 2554, 2555, 2556, 2557, 2558, 2559, 2560, 2561, 2562, 2563, 2564, 2565, 2566, 2567, 2568, 2569, 2570, 2571, 2572, 2573, 2574, 2575, 2576, 2577, 2578, 2579, 2580, 2581, 2582, 2583, 2584, 2585, 2586, 2587, 2588, 2589, 2590, 2591, 2592, 2593, 2594, 2595, 2596, 2597, 2598, 2599, 2600, 2601, 2602, 2603, 2604, 2605, 2606, 2607, 2608, 2609, 2610, 2611, 2612, 2613, 2614, 2615, 2616, 2617, 2618, 2619, 2620, 2621, 2622, 2623, 2624, 2625, 2626, 2627, 2628, 2629, 2630, 2631, 2632, 2633, 2634, 2635, 2636, 2637, 2638, 2639, 2640, 2641, 2642, 2643, 2644, 2645, 2646, 2647, 2648, 2649, 2650, 2651, 2652, 2653, 2654, 2655, 2656, 2657, 2658, 2659, 2660, 2661, 2662, 2663, 2664, 2665, 2666, 2667, 2668, 2669, 2670, 2671, 2672, 2673, 2674, 2675, 2676, 2677, 2678, 2679, 2680, 26

Four 30-wattage compact fluorescent lamps in a variety of colors on the mid-chaisego all contribute to warm tones, as do the fabric's light shades in some areas. Plush cushions add to the coziness. The sofa's low, wide, upholstered base is a subtle nod to the mid-century modern style.

And again, the guide to virtually all of Moore's compositions is *John Cage and John Cage's Music* by Cage himself, published in 1968. It is a book that Cage wrote for the *Journal of Music*, and it is a book that Cage wrote for the *Journal of Music*. It is a book that Cage wrote for the *Journal of Music*, and it is a book that Cage wrote for the *Journal of Music*.

[illegible]

The "darkness of the future" is not a moral dilemma, either, because that would be to insist on making that future more certain by preventing the events in the past that have led to the darkness. If we are to supply aid, it should be to help people through the darkness, not to prevent the darkness from happening in the first place. If this means that we must accept the possibility that some things will be done very poorly, then that is a cost we must bear. It is always better to do good than to do nothing.

Y. Ichimura, I. Yamamoto, and H. Sugita are grateful to the Japanese government for their support of this work. I. Yamamoto is grateful to the Japanese government for their support of his research.





THE SIMPSONS: BART VS. THE WORLD (MCA Home Video, \$24.98) Bart Simpson, the yellow-skinned, blue-shirted, yellow-pantsed, mischievous, and somewhat rebellious young man, is the star of this animated series. In this game, Bart is the only character who can talk, and he's the only one who can think of things. The game is a platformer, and it's a lot of fun. Bart is the only character who can talk, and he's the only one who can think of things. The game is a platformer, and it's a lot of fun.

AGE 8 AND UP

Available on



THE SIMPSONS

Available on

THE SIMPSONS: BART VS. THE WORLD (MCA Home Video, \$24.98)

Bart Simpson, the yellow-skinned, blue-shirted, yellow-pantsed, mischievous, and somewhat rebellious young man, is the star of this animated series. In this game, Bart is the only character who can talk, and he's the only one who can think of things. The game is a platformer, and it's a lot of fun.

AGE 8 AND UP

THE SIMPSONS: BART VS. THE WORLD (MCA Home Video, \$24.98)

image is used. This is the first time the word "Simpson" has been used in a video game. The game is a platformer, and it's a lot of fun. Bart is the only character who can talk, and he's the only one who can think of things. The game is a platformer, and it's a lot of fun.

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gameplay. With a few glitches, the game is a lot of fun. Bart is the only character who can talk, and he's the only one who can think of things. The game is a platformer, and it's a lot of fun.

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Features

The game is a platformer, and it's a lot of fun. Bart is the only character who can talk, and he's the only one who can think of things. The game is a platformer, and it's a lot of fun.

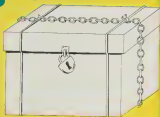


Program

Preventing your latest masterpiece from being listed and copied can be quite a problem.

We give you a few ideas on how to protect your work.

By F. Moane



Protection

Keeping prying eyes from looking at your latest program can be quite a problem. This article is an attempt to give a comprehensive guide to most of the methods of protection. All these methods are to stop your friendly neighborhood hacker from breaking into your program.

Unfortunately it is almost impossible to stop a person from actually copying your work with the range of cartridges and software available today. Anyway, here are some ideas to read your Commodore.

RUN STOP/RESTORE

Commodore 64

RUN STOP + RUN STOP/
RESTORE
Disable POKE \$B4,\$B4 POKE
\$B4,\$B4
Enable POKE \$B4,\$B4 POKE
\$B4,\$B4
Enable POKE \$B4,\$B4 POKE
\$B4,\$B4

RUN STOP + RUN STOP/
RESTORE + LIST
Disable POKE \$B4,\$B4
Enable POKE \$B4,\$B4

RUN STOP + INTERNAL CLOCK
Disable POKE \$B4,\$B4
Enable POKE \$B4,\$B4

RESTORE
Disable POKE \$B4,\$B4
Enable POKE \$B4,\$B4

Commodore 128

RUN STOP + RUN STOP/
RESTORE
Disable POKE \$B4,\$B4
Enable POKE \$B4,\$B4

RUN STOP
Disable POKE \$B4,\$B4
Enable POKE \$B4,\$B4

RESTORE
Disable POKE \$B4,\$B4
Enable POKE \$B4,\$B4

Disabling other keys

SHIFT
Disable POKE \$B4,\$B4
Enable POKE \$B4,\$B4

CTRL/SHIFT
Disable PRINT CHR\$(0)
Enable PRINT CHR\$(0)

WHOLE KEYBOARD (for printed
output only)
Disable POKE \$B4,\$B4
Enable POKE \$B4,\$B4

Prevent Reset

There is a method to defeat a reset switch on the 64 or the built-in switch on the 128. It involves an unpowered cartridge and a card only with a machine code routine, which is executed on a reset call.

Basic programmers could also use this method by pointing to a machine code routine which would run their program.

The locations are as follows:

0000-0000 (0270-0270)

Start address of routine to jump to on reset in low byte/high byte format.

0002-0002 (0272-0272)

Address for the RESTORE key to jump to when pressed in low byte/high byte format.

0004-0004 (0274-0274)

Put the bytes 0C3, 0C2, 0C0, 038, 040, 003, 040 into these locations. Values are ASCII for 00000, the cartridge identifier code.

Some games authors define the RESTORE key to restart the program and the RESET key to point to a warning message, or even a small game!

Preventing List

If, by accident, your Basic program falls with an error, it is easy for a hacker to list the program. POKE 00104 does the job of scrambling LIST but the methods discussed here are tougher to disable.

The simple methods

At the start of your program put a line with a REM statement followed by a SHIFTED L. The program will fail with a SYNTAX ERROR.

This protection is easy to defeat, most certainly the line with the REM statement will reveal the rest of the program.

POKE 79,134:POKE 75,210

Now the computer code LIST is typed. If you use the reset protection, your program will restart. That should tell you!

The more complicated methods

List in your program and PRINT POKE(2040) Note this down and then POKE 2040,255 The program cannot be listed but will RUN correctly.

This method has a drawback as if there is a GOTO or GOSUB in the program to a lower line number, Basic gets confused. Below such an action, POKE 2040 with the value that was previously stored and remember to put 225 as 2040 when the GOTO or GOSUB is finished.

Add the following lines to your program exactly as shown:

```
0510200
:*****
```

Now, enter the following strings of POKEs in direct mode, each separately:

```
POKE200,100 POKE200,20
POKE200,120 POKE200,40
POKE200,30 POKE200,80
POKE200,100 POKE200,70
POKE200,170 POKE200,100
POKE200,0 POKE200,0
```

These POKEs are machine code to move the start of Basic to the start of your program. The last two POKEs are the end of program's two-bits to just after line 0. Feel free to disable the machine code.

The result of all this is a program that runs as normal, but fails as SYNTAX.

Practically impenetrable!

LIST Tricks!

LIST is a powerful command. A couple of one liners can modify it considerably.

POKE 714,0

This has the strange effect of listing only the line numbers of a program. The POKE could be placed in a loader program to protect the subsequently loaded main program.

POKE 22,20

An instant wordprocessor! Using the Commodore's powerful screen editor, text can be manipulated, printed and saved without a program. The method is to type your text as a BASIC program with line numbers when finished, enter the POKE and the line numbers respectively then press!

Autosave

Most Commodore owners will be familiar with the concept of saving programs, ie, loading a second program from within the first. This has the advantage of automatically saving the second program. Problems are sometimes encountered if the saved program is longer than the first.

Using this method, protection can be set up in a short loader program so that interrupting the load would be impossible.

```
10 POKE 00104:REM RUN
STOP:RESTORE
20 POKE 714:REM LIST
PROTECT
30 PRINT CHR$(4),
"LOAD"&CHR$(0)+ "PROGRAM
NAME"& CHR$(30)+":1"
40
POKE 1100:PRINTCHR$(7)
NEXT
PRINT"RUN"&CHR$(0)+ "LOAD AND
RUN PROGRAM
50 POKE 60,10:POKE60,
10:POKE60,10:POKE60,3
60:REM SET KEYBOARD
BUFFER WITH HOME AND 2
RETURNS AND GUESS TO
THREE PRESSSES
70:NEW:REM ERASES THE
LOADER AND LOADS THE
PROGRAM
```

I hope the REMs explain what the program does. The method is only useful if there is no printed manual on the screen to be corrupted. Of course, the loader program itself can be listed. A REM SHIFTED L could save this.

Programs are provided to illustrate two other methods of protection. The INPUT BUFFER program sets the input buffer to simulate a keyboard entry, without displaying the screen.

The AUTOSAVE program is even sophisticated as that it can machine code to alter your original program so that it always RUNs itself. Protection from RUN STOP RESTORE is included and a message can be put on the screen.

To use these utilities, have the AUTOSAVE program in memory and your Basic program on disk. When asked for a message, enter the text that you wish to be displayed before your program runs. Input the name of the old program, and a different name for the automatic version.

Obviously, the new program will take slightly more space on the disk. However, if you use the protection methods in this article, you will have a program which automatically deletes RESET protection, is impossible to stop and contains where LIST is typed!

You can't damage the computer with software, so experiment. I would warn you to keep backup copies as some of the methods could result in the loss of the program. Remember to save your program with the protection before running as there is usually no way to get out of it!

Sprite manipulation for Basic programmers can sometimes be a real chore - but not any longer.

By Alan Ober

SPRITE



CONTROLLER

You probably have a sprite designer such as Your Commodore don't You Know! With which you designed some alien or fancy letter for a title screen that will never exist. One reason why this will never exist, may be because you don't know how to program the sprites to appear on the screen, or maybe you just can't be bothered to set up all those sprite colors and X and Y co-ordinates. Exactly how you want them. Sprite Controller can solve both of these problems.

Sprite Controller allows you to place up to eight sprites on your Commodore. Your sprites can be displayed in any way you wish, horizontal, vertical, color, X expanded, Y expanded, whatever is necessary. Then a small piece machine code program can be created and executed with a SYS call which will run the compiled file. All of this is done without the need to know or even understand machine code.

Using the program

Type in **SPRITE PROGRAMMER** (CH8) and save it temporarily just to come anything goes wrong when you try to run it. If all goes well, running the program will result in a file called **S PROGRAMMER** being saved to tape or disk.

Next, type **NEW** then enter and save **SPRITE PROGRAMMER** which is a normal Basic program.

The finished program is very easy to use. It can be used by an experienced programmer who doesn't wish to play around with the tedious task of manipulating sprites and trying to get the exact screen positions, or by a beginner because of the simple method in which data is entered.

The way in which a series of sprites is set up is by using switches - 1 for on and 0 off. To make it easier to go through the process of setting up two sprites.

First load **Sprite Programmer** and

run it. The machine code then loads in and the title screen appears. Pressing a key takes you to Page 1.

The screen has three boxes, [NAME], [EXPAND] and [Y-EXPAND].

These categories are all fairly self-explanatory.

To set up two sprites, let's use sprites 0 and 7 which must first be enabled, so press E for enable. A prompt will appear at the top right of the screen, asking for 0-7. What it's asking for is the sprite we wish to enable, in this case we first want to enable sprite 0. Press 0, a 1 appears under sprite number 0 in the enable box. Repeat the process for sprite 7.

This operation works in a toggle, so to turn sprite 7 off, just repeat the process.

Once sprites 0 and 7 have been enabled you can expand them. Press X for the X expansion and Y for the Y expansion. In this case we'll expand both X and Y expansion for you to play around with. It uses a similar method to enable.

Pressing F1 will take you to Page 2. The three boxes here are [Address], [X] and [Colour]. To make sprite 7 multi-colour, press M and then 7. The box now tells us that sprite 7 is multi-colour (set to 1), and the address is zero (set to 0).

The Use box shows which sprite is under control when placing sprites on the screen.

The Colour box works slightly differently to the others. Press C and the (colour) prompt will appear: 0-15. To set sprite 7's colour to white, press 0 and the colour prompt will appear: 0-15. As you may have guessed, it's asking for one of the sixteen colours available to you on your C64. We want our sprite to be white, so look up the colour code for white in the manual and enter the value (which happens to be 1).

The colour box will now show a 1 under sprite 0, telling us it is set to white. Try and set sprite 7's colour.

Pressing F1 again will take you to the last page. Here you are presented with eight boxes. In boxes 0 and 7 there should be sprites of some description because these were the ones we enabled, but not necessarily the ones you want.

Beneath the boxes are some numbers: these are the sprite data pointers. When you designed your sprites they were placed in a certain part of memory and these data pointers will be used to tell the computer where, in memory, to get your sprites.

Sprite Controller allows you to set blocks 140-155 (140-MFF hex). If you use the 1 as 1 Editor, the blocks are shown at the corner of the grid. Let's say you have designed your two sprites in blocks 5A1 and 5A1. First convert this to decimal, so 5A1 is 141 (109 + 32 = 141) and 5A3 becomes 143 in decimal. Now we have to give the program these new values, so press H and enter the sprite number you wish to alter. For sprite 0 this is key 0. A prompt will then appear ready for you to enter your new value. Key in 141. We have now given sprite 0 its new data pointer of 141. Now change sprite 7's data pointer to 143.



Placing sprites on screen

We are now ready to place the two sprites on the screen. Remember on Page 2 the Use command? At present it should be 0, meaning that it'll be positioning sprite 0 on the screen. Usually you would have to toggle between Pages 2 and 3 when using and placing sprites but it is possible to set the Use command as Page 1 even though it's not shown.

After you have entered the sprite you wish to use press P on Page 1. The screen will clear and display all the sprites that are enabled, but you can only move the sprite that you have selected. The cursor keys will move your sprite around the screen. When you are happy with it's position, press RETURN.

Before entering the screen, the screen colours are stored so you may change them without altering the sprite colours. Note that the colours on the previous screen will appear on the completed program.

Extra options

Pressing F1 will take you onto a menu of other options which may be called up from any of the three pages. You should understand most of the options but one or two need to be clarified.

When you use the Save Variables option, you are able saving the data you have entered up to date and it can be reloaded to be completed later. Be careful when loading options as because blocks lower than pointer 140 will result in the sprite programmer being overwritten.

Creating the code

After you have entered in all of the data and placed the sprites in their correct positions, you are then ready to compile your program. I recommend that you save your data first because the compiled file always be edited. On Page 3 press C and enter the decimal value for the start address. In other words, where in memory you wish your code to be produced. The default location is 4096 (10000).

When compilation has finished the start and end address are displayed. If you wish to have more than one compiled program in memory at a time, then I advise you to jot down the end address of each part so you know where to enter the new code after the previous one.

You will now be asked for a device number (RETURN = disk) and a filename for your code to be saved under. A SYS number will be given after you have saved your code, make a note of it.

When you load your created file, the SYS number can be used in your program to activate the routine. Machine code programmers can convert the SYS number into hex and use a HEX or JMP command e.g. HEX 1C000 or JMP 1C000.

Better late than never

I made a late addition to the program so it is now possible to display a background screen to help when placing your sprites. By pressing PB a screen can be loaded at location 53760 (D4000). I thought this useful for newcomers when sprite positioning seems just accurate, such as for start pointers to games.

Have fun

ULTIMA IV

A t last *The Amiga* version of one of the classic role-playing games has been released by Origin Systems. Although the fourth game in the series, *Ultima IV* is a quantum leap forward from its three predecessors.

Over the destruction of Baramos had been completed, as told in *Ultima III*, there were many upheavals, both geographic and political. New continents rose while others sank without trace. A large continent, fused together and it was upon this land that Britannia, that Lord British managed to bring some semblance of normality. As the Dark Age moved towards a new Light Age, the philosophers decide that a new set of moral values are called for. So it is that the quest for the Eight Virtues of the Avatar begins.

While taking a walk in the country one day, you are surprised to see a strange light appear in a stone circle near by. Further investigation reveals an arch and a couple of books. As you continue your journey, you feel drawn to a mechanism that that you could swear wasn't there before. Instead of demanding your entrance money, the gatekeeper sets your skills and wisdoms you hourly. You find further down to a grey cavern where an old lady offers to tell your fortune.

In front of you, she places a pair of cards and asks you to choose between them. The cards represent questions based on the eight virtues: honour, valour, compassion, honesty, humility, justice, sacrifice and spirituality. There are no correct answers. For example, the King sends you on a delicate-diplomatic mission. In the transport that follows, your country is terribly assaulted. Do you hate your king in order to try and save the talks or do you stand up and defend your country to the best of your ability?

Once your career has been determined in this way, you are transported once to one of the eight cities of Britannia, each one specialising in one of the virtues and races of characters. As the user of the game, you are on your own. You will have to persuade seven other characters to join your party. Some will do so willingly, others will only join when you have reached a certain level of experience.

The initial quest involves building up your character so that he, or she, attains partial Avatarhood in each of the eight virtues. This is not as easy as it sounds because you will need to discover the appropriate items to modify or know the correct mantras and have found the appropriate cave. You must also have proved that you have reached sufficient proficiency in the virtue.

Information about various objects is gained by talking to everybody that you meet. Initial requests can be made to see a person's name, job or state of health. From the second game, you get a clue to the next keyword about which to ask. Frequently you are over-referred to mantras due to the other rules of the computer — ask or the Polley Tones about Mandrake and you'll see what I mean.

The latest incarnation, although very limited does do give the game a definite, realistic edge over its rivals and is a start to introducing a system of non-player characters as found in traditional role playing games.

Transport is usually by foot but there are several other



methods of moving about more quickly. Horses can prove useful but you are likely to make more use of the magic-gate. Britannia has two moons and, depending on the phase of these, moon gates appear at certain locations. Each gate stays open for three segments of time, each segment transporting you to a separate location. Sea travel can be achieved by equipping yourself a pirate ship although you will need to master the art of using the winds.

Fighting is not just a case of using the right weapon and casting a spell or two. Instead, every combat encounter is fought over a mini playing area in which characters and monsters can move, as well as attack. As the monsters can attack along diagonals and you can't, you will need to give serious thought to your tactics. Making the best use of any muscle-coating members of your party could well be the key to success.

Spells play a vital part in any fantasy role-playing game and the magic systems in *Ultima IV* is one of the best that I have come across. Several professions have a magical slant; although, obviously, it is the mages who will be doing most of the spell-casting. Characters have a number of spell points and can cast spells according to the ability. Providing, that is, that a suitable spell has been previously prepared.

Conceptually, *Ultima IV* doesn't look anywhere near as pretty as its rivals, *Bard's Tale* for example, but, as they say, the play's the thing and here *Ultima* scores very heavily. The storyline is coherent and, what is more, credible. No doubt will you find stories with legs (*Phantasm III*) or monsters nearly lost away in a run by the room (*Bard's Tale*).

For anyone who has seen the C64 version of *Ultima IV*, the conversion will come as something of a slight disappointment. The two versions are more or less identical. Not surprisingly, the graphics are better on the Amiga — but neither has not devastatingly so. One area where things could have been improved is in the system of command entry where use of the keyboard is still necessary. I felt that a series of pull-down menus could usefully have been implemented.

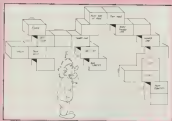
That apart though, *Ultima IV* is a superb game offering between one and two hundred hours playing time. You should just have time to get close to completing it before the long awaited *Ultima V* appears. Very highly recommended.

Gordon Huxlett

Footnote

Full Name: *Ultima IV: The Avatar's Tale*
Full Name: *Ultima IV: The Avatar's Tale*
Manufacturer: Origin Systems
Distributor: Microprose J
Marked Price: £19.95
Barcode: 0488-14328
Barcode: 0488-14328

STRUCTURED PROGRAM *design*



The follow-up article to improving the standard of your programs with structured programming

By Derek Barrett

Following on from last time we'll continue to look at the third element — repetition.

Figure 2 shows the simple construction of a fixed loop. Ben A. leads us into the context and serves as a constant. It shows that it is a repetition box, and the figure 100 determines the number of times that the actions of C, D and E will be carried out. The variable name for the counter is usually written in the box.

What happens here is that actions C, D and E will be repeated as a sequence 100 times. This fragment of code should show the idea.

```

60 REM Process Number
100 FOR count = 1 TO 100
110 GET number
120 PRINT number
130 count = count + number
140 NEXT count
150 REM remainder of program
  
```




WHILE and REPEAT constructions are similar with the conditions included in the repetition box. (Figure 1)

The construction does not have a fixed number of repetitions so no number is included in the box. The controlling element in this case is that the variable TOTAL is less than 100. Since the values will be carried out at least once and repeated until TOTAL exceeds 100. Those of you who don't have WHILE or REPEAT constructions in your language will have to rework your code slightly to achieve the same result.

This is one instance where GOTO will have to be used. Look at the following fragment of code:

```
10 REM Process Number
100 GET number
110 PRINT number
120 total = total + number
130 IF total > 500 THEN GOTO 160
140 REM Remainder of program
```

The while/until a WHILE condition and as the GOTO only jumps a few lines the program is still readable. As you cannot draw a jump in Top Down design you should draw your design as Figure 2 so that it remains portable.

As I showed in the examples on selection, multiple conditions can also determine the repetition construction (Figure 3). Complex conditions can be shown alongside the box, to avoid trying to cram too much into a small space.

Reading Ahead

A common application of the top down technique is the reading of an undefined number of data items. Such a list usually has an End of File (EOF) marker (often -1 or -999) which must be detected to terminate the loop. To design this you can use a WHILE loop with the condition 'NOT END OF FILE'. This means that we must already have read an item of data before entry and must read again to the last box before re-entering the condition. This is commonly known as the READ AHEAD technique (Figure 1b).

This construction is a common trap for the beginner. Make sure that you understand it and test it thoroughly.

Find out for yourself what would happen for the following:

- a. B was omitted
- b. E and F were reversed
- c. After several numbers have been read on an EOF marker is read
- d. The first item read is an EOF marker

Procedures

When designing your latest masterpiece you will often find that the same part of the design crops up in several places. Why not group these together as sub-routines or procedures, saving space in the final code and adding legibility? In fact most

professional programs consist almost entirely of procedures, with the main part of the program being simply a list of calls to the procedures. This greatly aids legibility and also allows easier modification of the final program. All you have to do is write a new procedure and call it when needed.

Unfortunately Commodore BASIC does not support PROCEDURES but data have GOSUBs which although not as versatile, can be used for a similar function.

Procedures are shown on top down designs by a horizontal dividing line a short way down the box. The procedure name is written in the box. When a procedure is called from the main design no further sub-routine (lower) boxes are drawn from it. The procedure itself is shown on another sheet with the procedure box at the top. It may help in very large designs to show the page number of the procedure in the box as well.

Figure 11 shows an example. It calls the procedure DASHED-LINE which is on page 2 of the design. The result of running this will be to jump from B to the procedure, which draws a line of dashes across the page, then returns to C where 20 items and their quantities are printed. D calls DASHED-LINE again, to put a double line of dashes across the page.

Putting It On Paper

The design you produce will use up



Figure 2 - simple loop design



Figure 3 - repetition using WHILE condition

loss of paper. I used to sketch main use on A3 sheets before walking through them, modifying where needed, and then producing a final form, with a flowchart attached, before I start to code them. Very often the designs prove so much that a single sheet of paper is not enough and some way of linking several sheets is needed. I will now introduce the only other symbol that you will need. It is a circle with the page number in it as shown in Figure 12. (It is shown a link to page 2 and 12b shows the opposite link from page 1. Such advanced ideas are taxing on the brain aren't they? What will I come up with next?)

Conventions

We have now covered all of the constructions that are needed for even the most complex of designs.

Before we go on to a look at some practical examples there are a few conventions to top down design that I will get out of the way. Most of these will be apparent from the designs and some have already been mentioned.

There can only ever be one path from an elementary box back to the top of the structure.

The design reads from left to right and from top to bottom.

Subordinates of a box must be

a. all sequence boxes, or
b. all initiation boxes or
c. all repetition boxes.

Only one path of a initiation applies.

Problem Solving

Now that you understand the conventions needed in Top Down Design we can have a look at a practical problem and go through its design.

The first example is, at first sight very simple but will show the principle involved and also shows how Top Down Design can be applied to problems other than programming.

Playing In The Garden

Imagine that you are a keen gardener and you want to plan your bulb sowing into orderly rows.

You have decided that each bed must be prepared, planted with bulbs and finally watered.

This is easy. Start by putting a single box at the top center of the page and take it Process Garden. Then put a sequence of three boxes below

leaving a reasonable gap between each as we will expand downwards later. Label these boxes Prepare Bed, Plant Bed and Water Bed respectively.

You should now have something like Figure 13. That has solved the problem but let us suppose it is a little bigger now you decide that the bed should consist of

- One row of Begonias, spaced 25cm apart
- One row of Gladioli, spaced 36cm apart
- One row of Dahlias, spaced 25cm apart

How we must use repetition to determine the row. To add a repetition box below PLANT BED, label it ROW and indicate that it will be repeated 3 times. Now we must add a selection to select the correct type of bulb. Add three selection boxes below the repetition box. Label them IF ROW=1 2 or 3 respectively.

As the action of planning the bulbs will be the same at each time we can use a procedure. But first we must set up the parameters that we will pass to it. That is, the type of bulb and its spacing.

Add three boxes below the first selection box. Label the first Bulb

Figure 12 - repetition with complex IF/ELSE conditions



Figure 13 - read ahead technique

Main program design

Figure 13 - use of procedures for common code



Procedures on page 2

Figure 12 - links between pages of design

beginning. The new Spacing = 25 and the last a procedure called ROW.

Now we can design the procedures. On a fresh sheet of paper, start with the procedure block ROW. To save our balls there are two actions, marking the row and saving it, so add two boxes: MARK ROW and ROW.

Let's look at ROW ROW (line). You must save the correct balls at the correct spacing until you reach the end of the row so the balls have a good place to run between spaces. Add the box below ROW ROW and label it UNTIL ROW LENGTH > MAX (You could also use WHILE ROW LENGTH < MAX). I have assumed that MAX is a variable that is set up elsewhere but could be replaced by a figure of the row length is known.

The use of a variable allows for easier modification later if desired.

There are now three actions to

covering the row, saving a ball, moving along by the spacing, and adding the spacing to the row length. I finish by now that you can do that on your own.

There is a trap here, the next time you call the procedure ROW LENGTH will already be set to greater than MAX so the procedure would run before any balls had been saved. To get round this add another box, before MARK ROW, labelled SET ROW LENGTH TO ZERO. This will ensure that the procedure will be reset each time you enter it. You could have it at the end of the procedure but think again if it takes if conditions are set on entry.

Now you can go back to MARK ROW. Here we add two action boxes. The first can be labelled something like MOVE LINE BY SPACING and the second DRAW ROW.

Having now designed the procedure you can go back and finish

off the design by filling in the detail for the remaining two selection boxes. You should have a finished design that looks something like Figures 14 & 15.

And you arrive at the same solution? Good, you have protodesigned your first program. You will have seen that the design was taken one stage at a time and that you haven't had to think about details at the early stages but programmed logically by breaking each step into manageable chunks.

There is never just one solution to a problem. Sometimes a more complex design leads itself to easier modification at a later stage. Always try to look for alternate solutions.

Problem No. Two

Let's take a look at another design. Some time ago I was working on a program for a sales ledger. This was written on Pascal on a mainframe

computer but I re-coded it into Commodore Basic to show that you can use any language. As the design was already proven, it ran first time on my C64.

My favored method is to design a complete program as fairly small modules, thoroughly testing each, before incorporating them into a final design. This avoids the problems of debugging a run, large program in one go!

Figure 16 shows the Top Down design for part of the program. This segment results in three items of information about a stock item (its description, quantity and price) and displays them in a table with total quantities and discount prices. Listing 1 is the source code in Pascal and Listing 2 is the same design in Commodore Basic. The only change that I made was to incorporate some test data at the end to avoid having to create a data file on disk first.

This listing is heavily commented to show how the code follows the design. It is good practice to comment your programs this way so it is a good aid to de-bugging and later modifications. You can always remove the comments from a working BASIC program to speed it up a little.

You will notice that the top down design includes a box marked INITIALISE VARIABLES. This is included because many languages require that all variables, etc are defined before they are used.

There is another box, INITIALISE CONSTANTS. It is good program design practice to use constants wherever possible and to put them high up in the program, so that they can be easily modified if the need arises. Here they are used for the discounts given and as will probably change during the lifetime of the program.

The rest of the design should be easy to follow from what you have already learnt.

That's the lot then. If you make a conscious effort to use Top Down Design in all your future projects you will soon gain the experience to be able to design efficient, well structured programs that are a pleasure to code and stock items for others to follow. Who knows? Perhaps one day magazines will start to include Top Down Design in their pages and allow the reader to program them in their favourite language. Don't just sit there, get designing your next, wonderful, program.



Figure 16 - solution to gardening problem



Figure 17 - procedure for gardening design



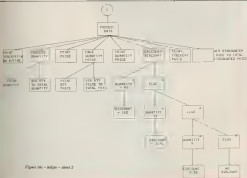
Figure 18 - design of a program



... ..

[illegible]

1000



doi:10.1017/S0022292412001706 Printed in the United Kingdom



The Fantastic Combat Bonanza

*Your chance to win
F16 Combat Pilot
and
Top Gun Fighters*

Why imagine being an F16 into a combat zone filled with battles when Digital Integration's F16 Combat Pilot could take you there. Add to that one of two brilliant books from publishers Ian Allen and you have all of the elements that make this competition a challenge you can't refuse.

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Ian Allen's have offered a copy of Top Gun Fighters and American Jet Power to the first winner picked from the list. In addition there are copies of the F16 Fighting Falcon by Peter R. Foster for the two runners up.

How to enter

Study the two extracts on this page and find the differences between them. When you think you've found them all, fill in the entry form and also note the number of differences on the back of your envelope, otherwise your entry won't be accepted. Send your entry to the address on the form by the 31st December and keep your fingers crossed.

The rules

Entries will not be accepted from employees of Argus Specialist Publications, Digital Integration or Ian Allen Ltd. This restriction also applies to employees families and agents of the companies.

The entry instructions form part of the rules and the Editor's decision is final. No correspondence will be entered into. In the event of a postal strike, we reserve the right to extend the closing date.

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Programmer Profile

Individually, Tony Crowther and Dave Bishop have enviable reputations but now they have combined forces.

By Eric Doyle

The ability to program is not the sole key to success in games writing. An additional skill is to be able to come up with an original game which is some help against the imagination and interest of a whole range of people. Tony Crowther has learned this the hard way.

Deriving an excellent game for a computer but being unable to find anyone to seriously convert it into a program is another problem Dave Bishop has learned this.

Put together an innovative programmer and a successful games developer team constructing backgrounds and the result can spark

as brightly as an arc lamp. The combination of Crowther and Bishop could set the software world alight.

Ratt's Tale

Anyone who has watched wondrous messages on Commodore demos will be familiar with Tony Crowther's alias of Ratt. Alongside his friend, Yik (Cliff Minter), Tony must be one of the most respected programmers in the industry. A programmer's programmer, he is renowned for the speed with which he can cobble together a program, yet he will program in demand, working late as much as possible.

At school, Tony was never very good with figures, in fact, he was not very interested in academic subjects generally but he could relate to anything with a practical application. Not surprisingly his main interest in A level was Technical Drawing though he supported the course more so than that in the DASH during his first year.

"I can't recall a challenge so when the teacher asked me if I wanted to pass or not I started to take things more seriously. Shuffling through the final year I was turning it good work and the course turned into a competition between myself and the rest of the class. The result was that everyone passed the exam that year!"

The underlying message in this tale is that Ratt is competitive and hates to be beaten. If he takes on a challenge he likes to excel which can make him an obstinate to work with but difficult to control.

His first encounter with computers occurred while ducking out of lessons. While almost everyone else was studiously attending class, Tony could be found playing on the computers in the school library. It was love at first sight and he was hooked.

For fun, he would help out at a local Sheffield hi fi shop, Superior Systems, which had recently branched out into selling computers. His spare time was spent in coming around with a VIC 20 on which he would amuse himself by translating programs into Commodore Basic from machines he saw on other machines.



Although his own version of an adventure like *Golden Arrow* was an exciting project at that time, the lack of speed forced him to try his hand at machine code. Armed with a crude monitor and a copy of Nick Humphrey's *NYC Revealed* it wasn't long before someone at Superior Systems started to take notice of the demos he was producing and a long, but not successful, relationship with Allegria Software was born.

Tony openly admits that his ultimate aim is to achieve fame and glory. He would love to have created *Pelicans* or to have been in Geoff Crammond's shoes as the designer of *Stratford*. Consequently, one criticism of the younger Tony was that he would guard his projects jealously and refuse outside "interference" no matter how well meant it may have been.

Eventually, to let this staying with Allegria was not as his best interests, switched to Camden for a while and then found total freedom with Wizard Development. William Wubbler was his final project with the company and, technically, one of his greatest achievements but the sales were disappointing and with the demise of the company he returned to Allegria but on a better footing than before.

Unfortunately, Allegria's money was starting to wane and despite great initial success for *Bar's Dap* and a large advertising campaign, the game flopped badly, and the follow-up *Knave* went much the same way.

About this time Aniselauff released Electronic Arts' *Marble Madness* which Tony saw as a good idea; again had two months later, armed with his own demo version of the game, he approached Aniselauff with all the clock of Tony in the TV series *Bay of the Black Staff* it's almost possible to visualize Tony slipping the Commodore *Marble Madness* into the nearest disk drive, saying, "I could do that GfM a job."

The team at Aniselauff were impressed but wouldn't release the game because they didn't hold the external rights to the game. They did, however, give him a job.

Once more Tony's ambitions were overruled but wouldn't release the game because they didn't hold the external rights to the game. They did, however, give him a job.

This was the long and tortuous



path which led Tony to Marscroft's door and his teaming up with Dave Bishop.

The Bishop's Tale

Dave Bishop has been involved with computers for several years but he has never been interested in programming. For him the thrill is to design the games he'd like to see and leave the rest to programming specialists like Tony.

On leaving Aston University with a Degree in Marketing, he worked for a while as buyer for the Games Centre chain before setting himself up as a distributor for Valera chess computers. During this period Dave also imported the first Space Invaders Quikboard peripherals and their success pulled him freely into the world of computer games.

During a spell as the software developer for Hemisphere software house, Aniselauff, he forged close links with Aniselauff. When he later launched his own public relations and game design company, Tigris Marketing, Aniselauff stepped up programs like *Deathwatch*, *They Saw A Million* and *The God Construction Set*. Strangely enough, that was happening at the same time as Tony was working with the company.

In mid-1986 Bishop quit and became a freelance game designer working for companies like Magenta, Serpik and Real Time (British Telecom's own suppliers and program developer), Marscroft and Pygmalion.

When Bishop and Bishop were teamed up for Marscroft's new image Works label, they formed an immediate



mutual appreciation society

"Tony's really great to work with. He's got a sense and knows what he's doing. He'll try anything. When I showed him the design for *Zig Zag*, he said it was impossible so I shelved the idea. A week later I had reworked his design and it was up and running!"

"Beth seems to pull her stress out of this too. Just before Christmas, he was testing our boxes. I went to bed and the following morning I found that he'd woken up in about four o'clock with the idea for *Bombastul*. By breakfast time the gameplay had been sorted out and the game was ready for me to start work on. By Christmas the first demo of the game was ready for approval as a special present for Image Works."

The *Bombastul* project was shelved for a while in favour of *Fernandes Must Die* but that didn't stop work on the game. As a result, *Bombastul* is ready for launch within weeks of its officially scheduled *Fernandes*.

Hopes and Fears

Time makes that the Commodore 64 can go on forever but, even for such a seasoned programmer, the thought of writing the Amiga hangs over him like a dark shadow.

"I wish I was like Ross. He can turn his head to anything. Show him a machine with a microprocessor and he'll master it."

Ross Godfrey, friend and long-time associate, has been with Tony since the Allegiant days of yore, through *AmigaSoft* and is now working on the ST version of *Bombastul* for Image Works. Unlike Ross, Tony feels that he needs to study a computer for some time and he's now very excited about his first pure Amiga project, *Phobia*.

"I wanted to quickly try programming something on the Amiga so I worked out the gameplay for *Phobia* myself. When I started to feel that it would work, Beth moved in and developed the gameplay further."

"I always want my games to be perfect and when I get an idea which means a totally new approach and programming which opens from scratch. This happened with *Phobia*, in fact it always happens. I just can't help it."

One thing Tony can't stand is the current trend of parking ST games across the Amiga.

"Anyone who thinks that the ST is as good as the Amiga has got things totally wrong. The potential of the



Amiga to produce superb quality sound and graphics is being underused. Barring *Zenith*, all the games I've seen so far look tacky. It would be better if games were developed on the Amiga and then modified for the ST."

One of the many things that Tony and Dave love in common is their non-commercial ideology.

"I must be getting older. I used to have all of my computer set up on the floor and I'd program them while lying on a large bean bag. At the PC Show I bought a large computer desk and chair."

A typical day for Tony starts at

3 o'clock in the afternoon. He'll then program through till about six, the following morning. He then spends a couple of hours watching videos of his TV programmes he may have missed while he was working. These are recorded by his extremely understanding and patient wife, Lisa.

Plans and Schemes

Dave Backups life is slightly more adventurous, unless an idea hits him.

"Some of my ideas are sparked off by seeing a game and thinking how it could be made better than *AmigaSoft*. I'll be inspired by a



dream. My dream game is an extremely vivid and I can recall them quite well when I wake up so I have to grab a pen and write down the details before I forget whatever what time it is.

Years of experience has given Dave a definite idea of how game designs should be marketed.

First of all, a new game plan should be original and not just a straight copy of something that already exists. The next stage is to find a publisher or development group to take on your idea. Even if you are program the game yourself, marketing is an expensive business to do well, so you're best advised to get a professional agencies drawn up by a lawyer and get it signed by the

company you approach before you tell them anything about your game.

There's more money to be made if you approach a publisher first, especially if you're a programmer as well, but if your game isn't extremely well presented and worked out your best recourse would be a development group.

Try to impress anyone you approach by being as professional as possible. Research the company, make sure they would be interested in your type of game and work out what you want to ask before you meet them.

Start off by telling them the name and the aim of the game and then present the game as a storyboard. Be enthusiastic but raise the few points to get carried away. Just because they're talking to you doesn't mean they'll be ready to sign on the dot.

"If possible, get an advance but in every case insist that you have signed contracts making sure you let a solicitor see it before you accept. Don't be so much to sign, if your idea's good, they'll wait."

"Ask about what will happen if the game is released ahead and, if the company has an official label in the States make sure that you get a percentage of the American income and not merely a one-off rights payment."

"If the game is going to be converted to a range of computer systems ask for a percentage as the originating author."

Dave is also warning when it comes to launching anything into the USA market.

"A game has to be cost effective for a publisher to be interested. If it's going to the States it must be convertible to the PC because 45-50% of the machines over there are PC. Don't be fooled by offers of just ST minis - the ST is dead and ready for burial over there."

When asked what programs had like to have designed, Dave's memory goes back a long way.

"I'd like to have designed *Elber* as the first it was launched. Looking back the game seems fairly trivial now but at the time it was a major breakthrough."

Other games on my topics include the Macintosh version of *Star Wars* and Macintosh's *Clash to the Galaxy*. And I rate as the best ever driving game and Electronic Arts' *WOLF* as a long time favourite.

"Although I'm currently hooked

on *Dangerous Manoeuvres* Simul stands head and shoulders above any other game I've ever seen. It's 100% original and Geoff Crammond is working short of a game in my opinion. Absolutely great stuff."

"Next is *Cybermand*. I also enjoyed *Jeopardy Sam* and *David Hudson's work*."

Simul is just another area for agreement between Dave and Tony. As time passes, it's not a frequent coincidence that their professional lives will run parallel for long. The bond of respect that obviously links them should mean they work on several more projects before the roll of other challenges becomes too strong to resist.



The Rait Pack
A Space
Son of Bigger

Comics
Pony Pigeon
Misty Hole

Howard Developments
Black Thunder
Griffin
William Webster

A Space
Trap
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or some of them!

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The first component of the program is a series of activities designed to prepare the participants to receive the information and develop the program. The second component is the actual program, which is a series of activities designed to provide the participants with the information and develop the program. The third component is the evaluation, which is a series of activities designed to assess the effectiveness of the program.

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Figure 1 shows the relationship between the number of

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Thus, with 1 year, only 4 of the 100 numbers would still be in the portfolio.



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Figure 1

Since a first point was to apply an existing and tried working approach of the programme, we also had put first-world priorities on top. This is to re-emphasizing a program that expands on the existing to not look out for a new.

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Pool of Radiance

You are in a dark, passageway with a door at the end. You look at the door and hear hulk-like noises but still decide to investigate. So you enter and see a small group of men playfully torturing a tall, fair girl. The men see you and, annoyed at the interruption, lunge at you."

If you recognize such an encounter, you have no doubt heard of the 1981 video game *Ultima*. It was the first of a series of computer games that started the

fantasy role-playing genre and it was the first computer game that was designed to be played on a PC. It was the first of a series of computer games that started the

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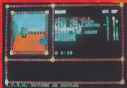
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CONFIDENTIAL REVIEW



as the apart from other games. For example, your mage won't be permitted to use cantrips, spells, or spells, or spells, and run away the and not fight on your own terms, and they can't use their bow. The party can also set up camp to rest and heal, drink, eat, and so on, and then they can continue their journey.

When you start a group of monkeys, you can start from opposite extremes: from wild and free when they are going to do-run away from their subjects; there is a variety of ways. Sometimes they will retreat or give their valuable information, such as the location of their treasure, but usually they will not. This leads to a number

My personal choice has been the "D" (Diet), Great Low Carb diet of the South where people eat more fat and less sugar and the carbs it adds are from butter. When it's the name of one of your characters, go to another name and repeat through which your character can more attack, based on growth that is good for your part. The target will be a constant in life, a bone.

To the left of the main group, you finally get a hint as to how it all fits, of what's happening, minus whether around 1960, 1965 and so on, but there target and what about any time had all the group of 100,000 events, but it's not, it's in the... some parts, but it's important and it's up to us to decide just how far you should go and make the course, leaders and stages, and so on, to make the whole of the... When it comes, first, and then... and other people there and... and then, as well, with what some... and be it... and so on.

These results mean that the all-male study was not a good estimate of the total number of cases of AIDS.

right foot or not laying in a pool of sweat then you will have to rest and gain a few points for every day you are in camp. This is painfully slow and should be used as a last resort as it also leaves you open to attack from enemies in the future.

As you tell me more about your poems, you will add to your experience poems and perhaps improve the impact of the meaning center based on evaluation. However you will also need 1800 gold pieces which may be quite difficult to come than the experience poems. Should you manage to find them then your chance will be increased, for more for poems and gain other benefits. For example, higher, for additional attacks as they reach higher levels and players and magic users can learn more quickly from a larger selection. In fact, is then climb up through the levels, the magic users become the most powerful character, drop lightning in the no more who drop the magic on the others.

Also on the job, you will find shops selling weapons and objects that you think may be useful (even offering inspiration and XP, simply profiting from being at a price and the lowest character where you will be rewarded for deeds that you have done).

[illegible]

The Postal Road was a narrow, rutted dirt road, no more than 10 feet wide.

initial drink than you want paper — and you began to — we must make — have a start, off now it — fought for the game and a drink for one to save other needs before you begin. A drink box would also be useful as there is a fair amount of drink clippings to be used (the dig.) water also made it was at the bottom of the pit.

The game CD-ROMs are accompanied by an instruction book that contains details of the game format and how to play, a character and the CD-ROM controls, a code wheel that is to be used to decipher a map, passwords level and the *Adventurers' Journal* that contains a host of information such as the monsters you will face and things that you find. These manuals are not as numerous and should only be read when the game prompts you to and include maps and *Vignettes of Fantasy* that are:

From all Blackman is a superb role playing game which both fascinates and entertains because of the skill and A.I.B. control. On the plus side, you are using the weapons and spells you know and fighting the monsters that you have fought before. The minus side is that you find existing A.I.B.D. players in that the game does the exact A.I.B.D. rules, whereas most players only use them as a guide. A final point which is important to some, but not all, players is that it is the opportunity to explore the world of Dungeons and Dragons and attack the thought that there are more to games.

Team Highlight

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Directory Editor

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Commonware disk directories suffer from one major drawback: deleting an old file in the middle of the directory leaves an empty gap which is filled by the next program to be saved.

When you save your next program, it must disappear somewhere in the depths of the directory instead of being added to the end. This can cause great confusion if you save a program which loads in two or more parts and the parts get separated and spread out.

Directory Editor should eliminate this problem, allowing you to re-arrange the directory in any way you see fit. It will also simplify various operations such as locking files and moving standard or split files.

Most of the options are fairly self-explanatory and foolproof, but a brief review of the commands is necessary.

DIRECTORY

This shows filename, filetype (including Deleted files), split and locked tags (shown respectively by a * before the file name and a < after it). The directory scrolls up and down under the control of the cursor keys.

Pressing the space bar inserts a space next to the pointer (the > on the left of the screen), and RETURN moves the file towards the pointer to a previously marked space.

F1 moves the selected file to that subsequently pressing F1 in other options results in that filename being taken as a topic.

ESC moves to the main menu.

NEWATCH A FILE

The same as Basic SCRATCH.

UNSCRATCH A FILE

Deletes a file which appears in the directory as DEL.

UNSPILT A FILE

A split file is one which was not saved properly. This option will not rebuild files which are split, but it may allow you to read data and convert it to another file.

LOCK A FILE

This allows you to protect a file against being overwritten.

UNLOCK A FILE

This removes the previous option.

RENAME A FILE

The same as Basic RENAME.

ALPHANUMERIC SORT

This sorts all files into alphanumeric order (similar to alphabetical order, but including numbers and punctuation characters). Replacing "N" to "S" in the file type will group files in the order PRG, REL, SEQ, USR. (If

the order doesn't suit you change SEQ to last 1990). Both options place any Deleted files at the end.

REWRITE DIRECTORY

This option should only be used when all alternate to the directory have been made. Nothing is changed on the disk until you select this.

If you change your mind halfway through and want to leave your disk as it is, press RUN/STOP.

Run before you work

The program will run, as written, on the Plus 4, C16 and C128, and should be compatible with all drives, although I'm not sure whether it will cope with double sided disks on the 1370. If you have mistyped anything you'll probably have to READER your disk again, so try it out first on an unused disk with some dummy programs.





Listings

Get it right first time with our deluxe program *LISTERS*
for the C64

You may have noticed that our listings are free of those horrible little black blocks which send you scurrying across the keyboard for a suitable graphics symbol. You may also have noticed the funny numbers by the side of each line of the listing. For instance, it is all part of our new, extra and

instead of those crude graphics and rows of countless spaces, a PRINT statement and things we use a special coding system. The code of instructions is always contained in square brackets, and you'll soon learn to decipher their meaning.

For example, [SA] would mean right in a Shifted A, or in all, of squares between a zero, and [SA00] would mean a line of ten of these symbols.

[S+] means 'hold down the shift key and press the plus key twice. It doesn't take a great leap of logic to realise that [S+] means exactly the same thing (except that the Commodore key (bottom left of the keyboard) is held down instead of the shift key).

If more than two spaces appear in a statement then this will be printed as [SPC4] or, more correctly, [SPC04]. Translated into English this means press the spacebar four times or in the latter case hold the shift key down while you do it.

A string of special characters could appear as [CTRL N DOWN LEFTS BLUE F1C5].

This would be achieved by holding

down the CTRL key as you press N, press the cursor key down twice, the cursor left key five times, press the key marked BLUE while holding down the CTRL key, press the F1 key and finally hold the Commodore key down while pressing the number two key. (A world of clever code, the computer goes to trouble!)

Also remember that you should only have a row of graphics characters on your screen with no square brackets and no comment unless something like this appears:

[SA] [C"]

In this case the two characters should have a comment between them.

On rare occasions [REV T] will appear in a listing. This is a dollar sign, and is created by entering the key up to the maximum. Then type a closing quotation mark (SHIFT & 2) and shift it. This sets the computer out of quotes mode. Hold down CTRL and press the number one key (SHIFT & 1), or the relevant number of inverted T's, and then hold down CTRL and press zero (SHIFT & 0). Next in parentheses quotation marks and delete it again. Now finish the line and press RETURN.

A lot of these special codes is given in the table but sometimes that only one of these instructions will appear outside of a PRINT using the symbol for pi. This may appear when a value is needed in a calculation so the row look something like

$CY = 2 * PI * R$
I mean, the square brackets and pi type as a shifted upward pointing arrow (in the parenthesis).

PROGRAM LISTERS (program)

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10 REM *****
20 REM *****
30 REM *****
40 REM *****
50 REM *****
60 REM *****
70 REM *****
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100 REM *****
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700 REM *****
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720 REM *****
730 REM *****
740 REM *****
750 REM *****
760 REM *****
770 REM *****
780 REM *****
790 REM *****
800 REM *****
810 REM *****
820 REM *****
830 REM *****
840 REM *****
850 REM *****
860 REM *****
870 REM *****
880 REM *****
890 REM *****
900 REM *****
910 REM *****
920 REM *****
930 REM *****
940 REM *****
950 REM *****
960 REM *****
970 REM *****
980 REM *****
990 REM *****

```

by Eric Davis

Checksum Program

The hexadecimal number type, when in a column to the left of the letters, should not be typed in with the program. These are merely checksum values and are there to help you get each line right. Don't worry if you don't understand the hexadecimal system as long as you can compare two characters on the screen with the corresponding two characters in the magazine; you can use our last checking program.

Typing in the Checksum Program, make sure that you do not make any mistakes and save it to tape or disk

immediately. In fact, it will be saved with most of the games and future listings appearing in your Commodore.

At the start of each programming session, load Checksum and run it. The screen will be shown with yellow characters and each time you type in a line and press the RETURN key a number will appear on the screen in white. This should be the same as the corresponding value in the magazine.

If the two values don't relate to one another, you have not copied the line exactly or perhaps you go back and check each character carefully. When you find the error simply correct it and

press RETURN again.

If you want to turn off the screen simply type SYS49152 and the screen will return to the Demos/Play screen. You can then do whatever it was you wanted to do and if this doesn't use the screen where Checksum lives you can go back in it with the same SYS command.

No system is foolproof but the chances of two errors cancelling one other out of the listings are presented in lower case. To run your computer to level 1054, mode press the Commodore key and the SHIFT key at the same time.

77

and just
printing

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Mnemonic Symbol Keypress

[RIGHT]		CURS left/right
[LEFT]		SHIFT & CURS left/right
[DOWN]		CURS up/down
[UP]		SHIFT & CURS up/down
[F1]		F1 key
[F2]		SHIFT & F1 key
[F3]		F3 key
[F4]		SHIFT & F3 key
[F5]		F5 key
[F6]		SHIFT & F5 key
[F7]		F7 key
[F8]		SHIFT & F7 key
[HOME]		CLR/HOME
[CLR]		SHIFT & CLR/HOME
[WSON]		CTRL & F
[RSH/FF]		CTRL & 4

Mnemonic Symbol Keypress

[BLACK]		CTRL & 1
[WHITE]		CTRL & 2
[RED]		CTRL & 3
[CYAN]		CTRL & 4
[PURPLE]		CTRL & 5
[GREEN]		CTRL & 6
[BLUE]		CTRL & 7
[YELLOW]		CTRL & 8
[POUND]		£
[LARBOW]		←
[RARBOW]		→
[PI]		SHIFT &
[INST]		SHIFT & INST/DEL
[REV T]		rev test
[C/line]		COM + line
[S/line]		SHIFT + line

YOUR

COMMODORE

Listings

F-Key Labeler



PROGRAM: FUNCTION KEY LABELER
— C64

```

80 0 F000 0000 10
81 10 000 0000 0 00000000
82 00 0000 0000 00000000
83 00 0000 0000 00000000
84 00 0000 0000 00000000
85 00 0000 0000 00000000
86 00 0000 0000 00000000
87 00 0000 0000 00000000
88 00 0000 0000 00000000
89 00 0000 0000 00000000
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92 00 0000 0000 00000000
93 00 0000 0000 00000000
94 00 0000 0000 00000000
95 00 0000 0000 00000000
96 00 0000 0000 00000000
97 00 0000 0000 00000000
98 00 0000 0000 00000000
99 00 0000 0000 00000000

```

```

100 00 0000 0000 00000000
101 00 0000 0000 00000000
102 00 0000 0000 00000000
103 00 0000 0000 00000000
104 00 0000 0000 00000000
105 00 0000 0000 00000000
106 00 0000 0000 00000000
107 00 0000 0000 00000000
108 00 0000 0000 00000000
109 00 0000 0000 00000000
110 00 0000 0000 00000000
111 00 0000 0000 00000000
112 00 0000 0000 00000000
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151 00 0000 0000 00000000
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196 00 0000 0000 00000000
197 00 0000 0000 00000000
198 00 0000 0000 00000000
199 00 0000 0000 00000000
200 00 0000 0000 00000000

```


LISTINGS

```

1000 PRINT "*****PROGRAM START
1010
1020 FOR I=1 TO 1000
1030 PRINT I
1040 NEXT I
1050
1060 PRINT "*****PROGRAM END
1070
1080
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```

```

1000 GOTO 1000
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```

Double Height



PROGRAM FOR MICRO-COMPUTER

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```

```

1000
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```

PROGRAM FOR MICRO-COMPUTER

```

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YOUR COMMUNITY December 1999

LISTINGS

[illegible]

100

YOUR E-BOOKS: December 1992

LISTINGS

68	BOHNS DATA 0 200 0 200 0 200	72	BOHNS DATA 0 200 0 200 0 200	80	BOHNS DATA 0 200 0 200 0 200
69	BOHNS DATA 0 200 0 200 0 200	73	BOHNS DATA 0 200 0 200 0 200	81	BOHNS DATA 0 200 0 200 0 200
70	BOHNS DATA 0 200 0 200 0 200	74	BOHNS DATA 0 200 0 200 0 200	82	BOHNS DATA 0 200 0 200 0 200
71	BOHNS DATA 0 200 0 200 0 200	75	BOHNS DATA 0 200 0 200 0 200	83	BOHNS DATA 0 200 0 200 0 200
72	BOHNS DATA 0 200 0 200 0 200	76	BOHNS DATA 0 200 0 200 0 200	84	BOHNS DATA 0 200 0 200 0 200
73	BOHNS DATA 0 200 0 200 0 200	77	BOHNS DATA 0 200 0 200 0 200	85	BOHNS DATA 0 200 0 200 0 200
74	BOHNS DATA 0 200 0 200 0 200	78	BOHNS DATA 0 200 0 200 0 200	86	BOHNS DATA 0 200 0 200 0 200
75	BOHNS DATA 0 200 0 200 0 200	79	BOHNS DATA 0 200 0 200 0 200	87	BOHNS DATA 0 200 0 200 0 200
76	BOHNS DATA 0 200 0 200 0 200	80	BOHNS DATA 0 200 0 200 0 200	88	BOHNS DATA 0 200 0 200 0 200
77	BOHNS DATA 0 200 0 200 0 200	81	BOHNS DATA 0 200 0 200 0 200	89	BOHNS DATA 0 200 0 200 0 200
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80	BOHNS DATA 0 200 0 200 0 200	94	BOHNS DATA 0 200 0 200 0 200	95	BOHNS DATA 0 200 0 200 0 200
81	BOHNS DATA 0 200 0 200 0 200	96	BOHNS DATA 0 200 0 200 0 200	97	BOHNS DATA 0 200 0 200 0 200
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83	BOHNS DATA 0 200 0 200 0 200	100	BOHNS DATA 0 200 0 200 0 200		

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B A E A H

Bag Folders

We'd like to remind our readers that we run a Bag Folder service.

If you have typed in one of our programs and despite much else, have not yet been given the folder as follows:

Two copies of your program on a tape or disk.

A description of your problem.

If possible a listing of your work (you may want this).

A stamped, self-addressed envelope for return of the program to you.

Should one of the above be missing, don't worry, we will not be able to deal with your query.

We will try to point out where you have made errors and place a corrected copy of the program back on to your tape or disk before we return it to you.

Do not send a program to us as soon as it stops working, please, check a several times first.

We do not do a large number of queries and so it may take a while for us to deal with yours, personally.

Please do not only deal with problems relating to programs published in *Your Commodore*.

Readers Problems

Though the *Commodore 64* is one of the world's most popular microcomputers, it can be very difficult to find specific information about your particular machine.

At the *Your Commodore* office we receive literally hundreds of letters from you, our readers, on a wide range of subjects ranging from the simple 'Can you give me the telephone number for...' to the more complex 'The way to write a program that uses a split screen. How do I do it?'

Unfortunately, the volume of mail received has become so great that it is impossible to answer every letter and still manage to publish a magazine each month.

For this reason we have felt it necessary to produce a number of guidelines for getting information from us.

If we cannot guarantee to answer every letter sent to the magazine, should it become apparent that a number of readers are suffering from the same problem, then we will reply to the letter via the Letters page.

If a new inquiry has been set up, this will be open for some queries on

Tuesday and Thursday afternoons between 3.00pm and 4.00pm. We will not be able to deal with your telephone queries at any other time. If our technical adviser is not available when you ring, then a message will be taken.

If you are having problems with one of our listings, can you please let us know in writing. This will enable us to see if a number of people are having the same problem. When a common problem becomes apparent with a program, then a correction sheet will be issued. Features a self-addressed, stamped envelope and we will send you a copy of the correction sheet as soon as it is available.

We are sorry that it has become necessary to relegate these rules. However, we are sure that you will agree with us that the more time that we can spend making *Your Commodore* the most informative magazine around, the better.

For program queries write to:

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Key Components of the Program

UNBEATABLE PROGRAMS:
 Sprite Controller △ Function Key Labeller
 Directory Editor △ Double Height Characters

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